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Agriculture.

THE PRICE OF COTTON.

The Queensland cotton crop for 1919, handled by the Department of Agriculture, was sold in Sydney at 1s. 6d. per lb., a price which gave the growers a clear 5½d. per lb. for their seed cotton, or an average of £22 18s. 4d. per acre. The price of cotton in Liverpool was then 1s. 11d. per lb.

Advices received during January, 1920, from London, by a city firm in Brisbane, gave the present price of ginned cotton as 2s. 7½d. per lb., the highest price ever known in the history of the trade as regards Upland cotton. The cotton crop of the United States was very bad last year, and the demand since the armistice by continental peoples has been enormous.

The Indian crop is reported as suffering from extensive strikes, and Egyptian is in short supply, several difficulties having to be contended with. One is, that owing to the rise in the water since the building of the Assouan Dam, many cotton areas have become water-logged, whilst another is the increase of the pink boll-worm pest, which is very prevalent. Experimental lots of long-staple Egyptian cotton are selling at 5s. per lb.

Now, then, is the opportunity for Queensland to revive and extend the cotton-growing industry, even beyond what was done during the American Civil War, when there were exported from the State 26,000,000 lb. of ginned cotton worth £1,300,000. This represents 30,000,000 lb. of seed, which was thrown away as useless. Had there been one or more oil mills in the State, over £50,000, the price of the oil being £23 per ton, would have been added to the value of the crop, and the linters left on the seed, owing to the want of linting machinery, would have been worth £100,000.

The Department of Agriculture is doing all in its power to assist cotton-growers, by supplying seed gratis, by making an advance on the crop, by ginning and marketing the cotton, and by dividing all profit derived from its sale amongst the producers. The machinery is up to date, and the addition of a linter machine saved all the short fibre on the seed, which was formerly thrown away. We strongly advise farmers to grow a few acres, more or less, of Upland cotton next season, as prices, so far from falling, are, according to calculation in America, very likely to rise still higher.

FODDER SUPPLIES FOR THE COMING WINTER.

By G. B. BROOKS, Instructor in Agriculture.

At the date of writing (20th December) the outlook for the man on the land is far from promising, and for the owner of stock it is assuming a most serious aspect. No rain of a really useful nature has fallen over the eastern seaboard of Australia during the past nine months; and the total since April, 1918, is considerably under the average.

During the past two winters—in the Central district, at least—the raising of fodder or hay crops has been in most instances a total failure, the exceptions being on land that had been fallowed. We have no assurance that the coming winter is to be any more favourable than the past two; therefore it would be wise—now that all reserves in the way of hay, &c., have been used up—for farmers to have their land prepared, and the necessary seeds in readiness, so that advantage can be taken of the rains that may fall during the first three months of the year to plant quickly-maturing summer-growing crops suitable for winter feed. Those recommended are as follows:—

PANICUMS.

Heavy crops of various Panicums can be raised—either for hay or silage—on well-tilled land if sown during January and February. Both the White Panicum and the Common or “Liberty Millet” are heavy-yielding sorts; while the Japanese, although a somewhat lighter cropper, has the advantage of maturing earlier, and, therefore, can be sown somewhat later than the others. To broadcast an acre, 16 lb. to 18 lb. of seed are required.

SORGHUMS.

For an easily-grown, drought-resisting, heavy-yielding crop—and one that can be fed in a succulent state during the winter—Sorghum undoubtedly stands alone. To secure best results, it should be planted sufficiently late in the season—say, January—so that it will attain full growth, but not fully-matured grain, before the cold weather sets in, and in this condition it will stand over the winter in the field to be cut as required. The varieties most suitable are Planter’s Friend (Imphee), Amber, Sassaline, and Sudan Grass. The latter, being a fine-stalked Sorghum, should be used before the advent of frost. Should any of the non-saccharine or grain varieties be grown, such as the “Milos” or “Feterita,” it is suggested that the seed heads be removed, which will induce shooting at the joints, otherwise the crop would—if fully matured—dry out. Sow in rows 3 ft. apart, at the rate of 4 lb. to 5 lb. of seed per acre.

It may be mentioned that most of the grain or non-saccharine varieties are heavy seed-bearers, which, when fully mature, have a somewhat dry and pithy stalk. I have found, however, that, by stripping the seed head at the stage when the seed has commenced to form, the stalk becomes as sweet and in some sorts even sweeter than the saccharine variety, and when fed to pigs have been preferred to such.

An objection raised by some against the growing of Sorghums is the danger of poisoning. Losses from this cause are extremely rare—in fact, most of the losses that have occurred are through not having Sorghums to eat. The danger is invariably during the early stages of growth, or before the seed heads appear. Should there be any doubt, feed it to one of the least valuable animals on the place and note results.

MAIZE.

A maize crop that has failed to cob should not, as it generally the case, be allowed to go to waste. It is an excellent green fodder, but, as it dries up quickly in the field, it has, in order to retain its succulence, to be converted into silage. The fact that the stalks, when harvested while still green, dried, and stacked under cover, make a very good chaff for home consumption is not generally recognised.

A NEW MOTOR PLOUGH.

In these days of high prices for horses, for horse-feed, and harness, the farmer finds that the interest on his investment in these animals, and the price of feed consumed when his horses are idle, make serious inroads on his profits.

“Popular Science Siftings,” London, in its issue of 4th November, 1919, describes the invention and perfection of a petrol motor plough which has opened up new possibilities for the small landowner who farms intensively.

The mechanism of the plough is exceedingly ingenious. The power is furnished by a two-cylinder, nine-horse power petrol engine. The initial expenditure for the plough with numerous attachments is about £80 in America. When it is in use, it, of course, consumes petrol; but the expense ceases at the exact moment that work is stopped. Just at that time, when horses would be eating their heads off, the plough costs nothing whatsoever. The engine is geared to the traction wheel through a shaft with universal joints, and these wheels are pivoted like the wheels of a bicycle, so as to turn right and left to guide the plough. The traction wheels have spike-like projections to prevent their slipping; different sets of spikes vary in length to meet the requirements of the soil to be worked. The suction created by the plough holds the traction wheels to the ground; and, as the suction varies with the nature of the soil, the plough works equally well in sod, loose ground, loam, or sand.

The plough can be operated by any person able to operate a petrol engine. It can be guided, thrown in or out of gear, reversed, or made to go faster or slower while the operator keeps both hands on the handles. The advantage over a horse-propelled plough is evident when such an obstruction as a rock, stump, or root is encountered. Instead of the customary straining and jerking, with consequent danger of breakage, the traction wheels simply slip until the operator throws the engine out of gear. He may then reverse the engine to back out, and then guide the plough over or around the obstruction.

The plough has numerous attachments that enable it to furnish practically all the power needed in seeding, cultivating, and harvesting an ordinary crop. The shovel hoe and disc harrow put the ploughed ground in shape; a planter attachment performs the seeding; and the disc cultivator and shovel hoe make possible thorough cultivation. A mow cutter-bar and rake make it possible to harvest small crops of hay, clover, peas, and the like. There is a spraying attachment for spraying crops or trees in rows; the engine propels the machine and at the same time operates the pump. A cart attachment for hauling moves the implements from place to place and takes a six-hundredweight load to market. The engine even has a high-speed gear for road work.

When there is no need for ploughing, hauling, cultivating, or harvesting, the engine is still useful for stationary work. It has a belt pulley attached; and the owner may easily operate a pump, feed-cutter, cream separator, a 24-inch wood saw, or a dynamo for lighting the farm buildings. The engine may readily be detached from the plough frame and used on a motor-cycle, light automobile, or delivery wagon. A man mechanically inclined finds almost limitless possibilities for it.

The petrol motor-plough has also proved a boon to the professional man or gardener who wishes to cultivate a small plot. For this class the cost of horses and the labour of caring for them is absolutely prohibitive. The machine has a tread of only 12 inches; this makes it possible to plant the rows much closer than if horses were used. In addition, the motor plough makes a shorter turn at the end; it does not step on young, tender plants; and it always stands without hitching. It is an ideal plough for orchard work, as it runs under low-hanging limbs and close up beside the trees without the least injury.

CONTROLLING SILAGE FERMENTATION.

Experiments carried out at Utah, U.S.A. (says the "Pastoral Review"), go to show that all waste connected with the curing of ensilage can be eliminated by the proper control of the ferment. Anybody who has had to do with silos knows that there is always a certain amount of decay in evidence at the top, and often at the sides. This is caused by the absence of a certain bacteria, and it was decided to introduce this by artificial means. For the purpose of the test a 200-ton silo was built of concrete blocks, each block having an enclosed air space, which it was considered would maintain an even temperature. The building was filled with a fully-matured maize crop (not green), and the contents of a 2-oz. bottle of bacillus culture used to impregnate two or three barrels that were deposited in the silage at various heights. The bacteria introduced was the lactic acid bacillus, which is the same as that used by dairymen for ripening cream.

A bacteriological examination showed that active fermentation took place a week after the silo was filled, and subsequent weekly examinations gave favourable results. The contents were fit to feed to stock within a month, and, although feeding was

continued slowly to give every chance for decay to develop, not the slightest sign of deterioration could be discovered. It was also found that no alcohol formed, and that the sugar and starch contents of the food were intact throughout. The man who fed the silage to his stock declared the value to be 50 per cent. higher than stuff treated in the ordinary way. The ensilage is described as having turned out bright, clean, and very palatable. The grains were unbroken and sound, but the brittle hardness was gone, while the stalks were soft enough to crush between the fingers. The smell was like that of a mild pickle, and stock ate it eagerly.

MARKET GARDENING.

UTILISING THE BACK-YARD.

During the late calamitous drought, many householders have been hard put to it to obtain a supply of vegetables for the table. This difficulty can easily be overcome by any city dweller who owns or rents a house with a perch or two of garden or back-yard. The writer owns a very small piece of ground on which his house is built, with a few yards of garden ground in front, and the same at the back. Being fond of gardening, he utilised every square yard available, mainly for growing vegetables. The result was that during the drought there was no lack of most of the culinary vegetables. The restrictions on the water supply were overcome by using the bath water, kitchen slops, &c., and during that hard time vegetables were plentiful. If a soil happens to be gravelly or a stiff clay, this can be overcome by hard work such as trenching, subsoiling, manuring, and cultivation.

The following notes, taken from "South African Gardening and Country Life," go to show the possibilities of the "Back-yard Garden." With intense cultivation, the back-yard gardener should be able to get twice as much out of a square yard as the market grower gets. To do this, you must train everything upwards, and thus take advantage of the space above the soil. For instance, the farmer's tomato will require, at least, a square yard of soil because it is allowed to sprawl all over the ground. Yours will require a square foot because it will be trained up a pole. Then you will grow two crops on the same ground at the same time, for you can grow vegetable marrows amongst sweet corn. The latter is tall and the foliage not dense, and the marrow either runs on the ground or forms a dense bush, according to the variety you grow. Then you will sow radishes with lettuce, carrots, parsnips. The radishes will be ready to pull before the other plants need the room. Again, rows of spinach can be sown between rows of newly-planted cabbages, and lettuce plants set between the cabbages in the rows, both will mature before the cabbages require more room. If you grow potatoes, set sweet corn between every other row, and have some young cabbage plants ready to plant out between the rows left vacant as soon as the potato tops show signs of dying down. Line the paths with radishes or carrot rows, and replace early peas and beans with cauliflowers. The great thing is to have something ready to plant as soon as each crop is ready to be removed. Use every corner—the rubbish heap will grow pumpkins, cucumbers, and melons, and runner beans can be trained up strings to the top of the fence.

In conclusion, the South African writer gives the total produce from a piece of ground 10 yards by 12 yards, and shows how sufficient vegetables were grown on it to serve a family of four for a year.

What can be done in South Africa can easily be done in Queensland. There are scores of houses built on 16-perch allotments, and on larger building sites, where the back-yard is only used as a repository for old cases, kerosene tins, discarded furniture, bones, old iron, &c. The owners of these vacant spaces buy their vegetables, not always fresh, in the city or local store, at prices far higher than what they could be produced for at home in a garden worked in their spare time.

Pastoral.

STOCK FOODS ACT.

Under the Stock Foods Act which came into operation on the 1st of January, 1920, it now becomes necessary for every wholesale seller of any mixed concentrated or prepared stock food or by-product to supply, on or before the 31st of January in each year, to the Department of Agriculture and Stock, Brisbane, a sample of such stock food or by-product accompanied by full particulars as to analysis, &c. If the wholesale seller is not a resident in Queensland, an agent in this State may act for him. Full particulars as to how the sample is to be taken are given in the Act and regulations.

All retail sellers must affix to each package a label giving all necessary particulars concerning the stock food or by-product, as well as the weight and the seller's name.

Every seller, whether wholesale or retail, will be responsible for the composition as specified on the label of the article.

Every invoice or circular relating to a stock food shall state specifically the material of which such stock food consists, and the invoice or circular shall constitute a warranty by the seller that the food consists solely of the materials and proportions specified, that it is suitable for stock, and that the weights are correct.

When hay, consisting of several kinds of hay, hay chaff made from several kinds of hay, straw consisting of several kinds of straw, straw-chaff made from several kinds of straw, mixed chaff or compressed fodder, are sold, the invoice must specify in each case each component part of the food sold.

When mixed chaff composed of a mixture of hay chaff and straw chaff is sold, each package must be marked M.S.

Straw chaff must be marked S.C.

For the purpose of securing observance of the Act, authorised officers have the right of access to premises where stock foods are prepared or sold, and they may, on payment of the ordinary market price, take samples for analysis.

The buyer of stock food is entitled, upon payment of fee, to have samples of stock food analysed.

Officers are empowered to demand information as to the origin of any stock food which may be exposed for sale.

The penalty for a first breach of the Act is a fine not exceeding £20; for a second offence, a fine not exceeding £50; and for each subsequent offence, a fine not exceeding £100, or to imprisonment for a period not exceeding six months, or to both fine and imprisonment. Proceedings may be instituted by an officer authorised by the Minister or by any person aggrieved.

All such proceedings shall be taken in a summary manner before a police magistrate sitting alone. The burden of proof that any stock food was not intended for sale as a stock food shall, in every case, be on the defendant.

All firms dealing in low-grade stock foods must keep a register recording their transactions in these particular foods.

The fee for the analysis of a stock food to be paid by a wholesale seller is £2 2s. per sample. Farmers will be charged a nominal fee of 10s. 6d.

The Act applies to hay, hay chaff, straw, straw chaff, compressed fodder, whole grains, or seeds, meals made directly from wheat, rye, barley, oats, corn, sorghum, beans, peas, lucerne meal, corn and cob meal, calf foods, poultry foods, condimental stock foods, bran, pollard, linseed meal, cocoanut oil cake and meal, dried brewers' or distillers' grains, malt sprouts, blood meal, meat and fish meals, digester tankage, corn gluten meal, corn germ meal, molasses foods, dried skimmed milk, dried buttermilk, corn bran, and sweepings and mill flaws, grain sheds, ships' holds, stores, wheat groundings, and damaged grain.

The following are at present exempted from the operations of the Act:—Lucerne and other fodder crops cut and sold as green fodder; molasses, sugar-cane, wet brewers' grains, arrowroot bagasse, whey, skimmed milk and buttermilk.

Dodder, thorn apple, castor-oil seeds and physic nut are specified as foreign ingredients, and any proportion of these substances is strictly prohibited in any stock food, and the same prohibition applies to any substance of ordinary character added for the purpose of fraudulently increasing the weight of the stock food.

With regard to foreign ingredients, it is stipulated that there shall not be in a food more than 5 per cent. of certain by-products of low food value unless the actual amount is declared on the invoice and label. Moisture is limited to 13 per cent., and salt to $\frac{1}{2}$ per cent. In the case where the stock food is a grain, the proportion of foreign grains must not exceed 5 per cent. by weight. In the case of hay straw and chaff, the bulk must consist of at least 90 per cent. of the species of hay straw or chaff named in the invoice, unless the straw or chaff is invoiced stating the different ingredients. When mixed concentrated or prepared stock foods or by-products such as meals, calf foods, poultry foods, bran, pollard, molasses foods, &c., are sold, the vendor must affix to each package the number of net pounds in the package, the distinguishing name or trade-mark of the stock food, the address of both the wholesale and retail sellers, and the chemical analysis setting forth the percentage of protein, fat, and fibre, and the name of each of the original grains or materials and the proportion of any foreign ingredients.

Every vendor, whether wholesale or retail, must keep a copy of the regulations under the Act displayed in his shop, shed, or warehouse. Copies of the regulations, printed on cardboard, may be obtained on application to the Government Printer, Brisbane, for one shilling.

SHEEP WITH SORE FEET.

“Frequently at about this time of the year,” recently wrote “Agricola,” in the “Otago Witness,” “sheep contract sore feet, perhaps from some abrasion in which dirt or vegetable matter lodges, and it is just as well to get them off the muddy fields to a dry place. Something more than this is required, though. The foot should be cleaned and treated with some drying healing mixture. There may be disease of a sort, not quite foot-rot, but worth treating as such. The first thing to do is to use a knife and scrape away the dirt and trim the horn of the hoof into something like a foot. Do not draw blood, but cut away all the loose horn. Then make a mixture of pulverised sulphate of copper mixed with water to a creamy paste and apply with a wooden paddle, and turn out the patient to a fairly dry paddock, out, at least, of the muddy yards. It is well worth while keeping an eye on all sheep going at all lame and pull them out and trim feet of useless horn, which only serves to harbour dirt and possibly breeds sores and lameness. Any trouble with feet very often means a great set-back in condition of the animal if allowed to develop at will.”—Exchange.

DOES WIRE-NETTING BREED RABBITS?

In view of the fact that the farmers of the New South Wales coast recently decided to spend £15,000 on a barrier fence fifty-five miles in length, to keep the rabbit pest in check, Mr. Coleman Phillips, of Wellington (N.Z.) has written to the president of the Casino Pastures Protection Board, stating that barrier fences in every State in Australia have proved ineffective. Mr. Phillips states that in Europe, Asia, Africa, and America wire-netting fences are not used, and these countries are not troubled with rabbits. Australia does use netting fences, and it is the only continent where the rabbit flourishes. The other countries rely upon natural enemies and diseases. Mr. Phillips adds that wire-netting, as a means of combating the pest, is a waste of money, as he found on his own run in New Zealand in 1883, when he had ten miles of back country and Crown boundary to clear of rabbits, which were swarming everywhere at the time. The plan that he had proposed to his neighbours was not to depend upon netting, but to turn out the natural enemies of the rabbit, and to spread the natural diseases. This plan was adopted, and no grain-grower in the district has been troubled with rabbits since, or has had to protect his crops with netting.

“For thirty years,” he concluded, “we have been free of rabbits.”

A MULE WITH A FOAL.

Mr. Jas. S. Love, Townsville, writes to the "Pastoral Review":—"My manager at Butcher's Hill Station, 60 miles outside Cooktown, reports: 'A jenny mule had a foal here the other day. I have heard people say that they have heard of a mule with a foal. Can you give me an instance? The jenny mule is from a half-draught mare by a Catalonian Jack (Spanish), and her foal is by a blood horse.'"

Can any reader supply us with an instance in which a mule, to their knowledge, has had a foal?

FRENZIED SHORTHORN FINANCE.

Under the above heading "The Farm" (Perth, W.A.) publishes the following record prices obtained at the sale of Mr. Duthie's Collynie Shorthorns in October last, which obliterated all previous price records wholesale:—

"The first lot offered was a beautiful red bull calf, 'Collynie King Lavender,' and the first bid made for him was 1,000 gns., increased within a minute to 2,000 gns., and thence by leaps and bounds to 5,300 gns., at which price Scotland let a Kentish breeder have him. Mr. Duthie already held the price record for a bull calf, viz., 4,200 gns., so that he beat his own and all other records by over 1,000 guineas. A dark roan heifer calf, 'Myrtle,' brought the record price of 2,000 gns. Mr. Duthie's bull calves averaged £1,400 8s. 9d., thus beating the same breeder's record, established last year, of £1,088 per calf. At the Collynie and Uppermill Shorthorn sales, 595 Shorthorns realised £205,497 13s., an average of £345 7s. 5d. Mr. Duthie's 39 'beasties' averaged £1,000 per head."

THE MOTOR METHOD OF FUMIGATING RABBIT BURROWS.

Reference was made in the "Farmer and Settler" some time ago to a new method of fumigating rabbits in their burrows devised by Mr. Walter Hawker, a well-known South Australian pastoralist. The method has been tried with success also in New South Wales.

Mr. Hawker's method was to use the exhaust from his motor-car to poison the rabbits. One end of a rubber hose was attached to the exhaust, and the other end was placed in the rabbit burrows. The engine was run with the throttle one-fifth open, and soon smoke issued from the burrows, which were filled in until no more smoke appeared. The engine was run for five minutes, then the hose was withdrawn, and the hole filled in. Five large burrows were fumigated; after a lapse of 30 minutes the first one was dug out, and one dead rabbit was found at the mouth of one of the holes. Next day, when all the fumigated burrows were dug out, over fifty dead rabbits were found, and only one live one, which was in a hole that had been missed.

Mr. Hawker spent six hours fumigating seventeen burrows that would have taken a team of seven men eight days to destroy by the old method at a cost of £32 2s. Working the car for six hours, two gallons of petrol and about one pint of oil were used, the total expense being about £1. Later the rabbit boss suggested using a small two-cycle engine, mounted on a spring cart. The silencer was taken off, and 30 ft. of 1 in. rubber hose used, so that all the fumes went down the burrows. The result was that all rabbits were killed a few minutes after the last burrows had been stopped.

Paddock No. 1, of 1,900 acres, took nearly three months to dig out, at a cost of about £300. Paddock No. 2, of 1,100 acres, under the new method, took under three weeks with three men and a cook, and less out-lying rabbits were left. The man working the engine acted as rabbit boss.

Commenting upon these experiments, the president of the New South Wales Graziers' Association (Mr. John Mackay) said that a member of the association had tried the new method in the Warialda district with equally favourable results. Many of the graziers (he added) were of the opinion that this simple means of destruction would revolutionise the methods of dealing with the rabbit.

Mr. T. G. Adamson, of Nemingha (N.S.W.), has forwarded to the New South Wales Minister for Lands (Mr. Ashford) a scheme for the wholesale destruction of rabbits by poison-gas in the burrows. The proposal is that gas be introduced into the burrow by a bulb or shell, which could be rolled in with a time fuse attached, or perhaps liquid fire could be used instead of gas. Special masks must be used by the operators, and the bulbs made fool-proof. Mr. Adamson says that his scheme is far more effective, handier, and more economical than the use of the poison-cart, or fumigator, or than shooting or trapping.—"Farmer," W.A.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JANUARY, 1920.

Considering the conditions of the month, the laying generally has been satisfactory. During the first ten days the laying showed a very marked increase, but as soon as the rain came a large number of pens, especially in the light groups, slackened. The heavy groups have shown an improvement on the December laying. There are only a few odd cases of moulting, and broodiness has not been quite so troublesome during the month. The health of the birds has been good, except that in the light breeds the feeding has not been all that could be desired. The following are the individual records:—

Competitors.	Breed.	Jan.	Total.
LIGHT BREEDS.			
*T. Fanning	White Leghorns	138	1,365
*J. M. Manson	Do.	125	1,359
*E. A. Smith	Do.	125	1,290
*W. Hindes	Do.	133	1,278
*Dr. E. C. Jennings	Do.	121	1,230
*Dixie Egg Plant	Do.	97	1,197
*G. W. Hindes	Do.	118	1,188
*Range Poultry Farm	Do.	117	1,172
*Quinn's Post Poultry Farm	Do.	113	1,166
*W. Becker	Do.	133	1,166
*Haden Poultry Farm	Do.	108	1,163
*B. Caswell	Do.	115	1,161
*C. P. Buchanan	Do.	119	1,134
J. H. Jones (Toowoomba)	Do.	101	1,127
*H. Fraser	Do.	116	1,120
S. McPherson	Do.	114	1,109
*L. G. Innes	Do.	79	1,106
W. A. Wilson	Do.	115	1,083
*W. Lyell	Do.	124	1,081
*Mrs. L. F. Anderson	Do.	107	1,076
*J. J. Davies	Do.	88	1,073
*Mrs. A. G. Kurth	Do.	102	1,065
A. Williams	Do.	88	1,044
*Thos. Taylor	Do.	108	1,043
G. J. Byrnes	Do.	98	1,037
S. W. Rooney	Do.	94	1,021
*Mrs. R. Hunter	Do.	93	995
Mrs. N. Charteris	Do.	117	988
Geo. Trapp	Do.	77	985
H. A. Jones (Orallo)	Do.	77	981
*O. W. J. Whitman	Do.	97	968
B. Chester	Do.	78	950
C. A. Goos	Do.	98	946
N. A. Singer	Do.	90	935
G. H. Kettle	Do.	85	933
Oakleigh Poultry Farm	Do.	99	914
J. W. Newton	Do.	75	913
H. O. Jones (Blackstone)	Do.	91	913
R. C. J. Turner	Do.	97	877
J. H. Dunbar	Anconas	102	825
W. Morrissey	White Leghorns	63	816

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Jan.	Total.
HEAVY BREEDS.			
*R. Holmes	Black Orpingtons	125	1,378
*E. F. Dennis	Do.	132	1,338
*R. Burns	Do.	126	1,315
*E. M. Larsen	Do.	97	1,254
*W. Smith	Do.	108	1,210
*A. E. Walters	Do.	112	1,202
*E. Morris	Do.	191	1,135
Geo. Nutt	Do.	91	1,127
*Kelvin Poultry Farm	Plymouth Rocks	101	1,123
*Nobby Poultry Farm	Black Orpingtons	92	1,095
*T. Hindley	Do.	108	1,090
*A. Shanks	Do.	68	1,078
*Mars Poultry Farm	Do.	121	1,078
R. B. Sparrow	Do.	116	1,044
*Jas. Ferguson	Chinese Langshans	99	1,038
*D. Fulton	Black Orpingtons	77	1,005
Burleigh Pens	Do.	105	975
*W. H. Reilly	Chinese Langshans	82	974
A. Homan	Black Orpingtons	97	971
*F. W. Leney	Do.	86	937
J. A. Cornwell	Do.	114	913
*H. Puff	Rhode Island Reds	63	892
C. H. Singer	Black Orpingtons	109	880
H. Ashworth	Do.	101	845
A. Gaydon	Do.	102	836
*T. B. Barker	Do.	59	834
Total	...	6,837	71,360

* Indicates that the pen is being single tested.

RESULTS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
T. Fanning	226	212	224	241	225	237	1,365
J. M. Manson	234	212	240	235	207	231	1,359
E. A. Smith	213	208	231	213	201	224	1,290
W. Hindes	224	221	217	196	207	213	1,278
Dr. E. C. Jennings	209	184	209	198	197	233	1,230
Dixie Egg Plant	188	204	209	202	187	207	1,197
G. W. Hindes	216	204	215	192	180	181	1,188
Range Poultry Farm	189	202	214	205	173	189	1,172
Quinn's Post Poultry Farm	188	190	198	228	180	182	1,166
W. Becker	226	204	215	185	153	183	1,166
Haden Poultry Farm	218	210	197	189	154	195	1,163
B. Caswell	163	141	191	225	251	190	1,161
C. P. Buchanan	168	217	166	187	186	210	1,134
H. Fraser	156	212	216	192	140	204	1,120
L. G. Innes	149	213	151	203	211	179	1,106
W. Lyell	169	194	202	171	176	169	1,081
Mrs. L. F. Anderson	198	209	170	186	148	165	1,076
J. J. Davies	177	183	188	175	170	180	1,073
Mrs. A. G. Kurth	219	189	189	175	138	155	1,065
Thos. Taylor	179	141	161	199	204	159	1,043
Mrs. R. Hunter	162	121	186	171	178	177	995
O. W. J. Whitman	153	191	145	147	172	160	968

RESULTS OF SINGLE HEN PENS—*continued.*

Competitors.	A.	B.	C.	D.	E.	F.	Total.
HEAVY BREEDS.							
R. Holmes	234	233	252	207	274	178	1,378
E. F. Dennis	229	208	238	218	195	250	1,338
R. Burns	230	198	210	281	212	184	1,315
E. M. Larsen	220	215	240	190	217	172	1,254
W. Smith	184	215	207	177	221	206	1,210
A. E. Walters	216	175	213	198	197	203	1,202
E. Morris	185	184	204	193	223	146	1,135
Kelvin Poultry Farm	251	168	185	135	199	185	1,123
Nobby Poultry Farm	175	158	163	178	207	214	1,095
T. Hindley	182	195	158	205	164	186	1,090
A. Shanks	86	154	226	176	206	230	1,078
Mars Poultry Farm	163	216	214	148	141	196	1,078
Jas. Ferguson	178	232	141	146	172	169	1,038
D. Fulton	148	171	169	157	178	182	1,005
W. H. Reilly	147	140	193	182	146	166	974
F. W. Leney	113	147	169	207	145	156	937
H. Puff	176	142	149	182	96	147	892
T. B. Barber	141	151	118	136	147	141	834

CUTHBERT POTTS,
Principal.

OLD ENGLISH GAME.

By R. T. G. CAREY, Beerwah.

Handsome, graceful, and beautiful are Old English Game, told in three words, more especially their carriage and style, and the pride and prowess of the male birds cannot be excelled, as their magnificent plumage calls for admiration as premier birds from a fancier's standpoint.

Their laying qualifications have nothing of importance to commend their usefulness as egg-producers, since they only lay a limited number of eggs in the year. But, for early broodiness, one is never disappointed, because the hens will sit very early, almost at midwinter, and have a clutch of chickens out and well advanced before breeders contemplate operating incubators. The hens' propensity to forage and feed their brood is superior to that of any of the other females of the fowl family. As defenders against reptiles or hawks, butcher birds, or any other enemy, they cannot be excelled.

Yet, notwithstanding all their usefulness in that respect, they are underrated, and a thousand pities, too, for if others knew how valuable an asset that early hatching may be, many a fowl-raiser would certainly possess a pen or two of Old English Game.

Apart from the above qualifications, the use of them for crossing purposes greatly improves the flesh value of the progeny crossed. I, myself, cross them with the Black Orpingtons, which I find is a better fowl for hatching, laying a larger egg. She is a more useful mother, better forager, and a powerful defender; yet gentler and more careful with the brood under her charge than I ever found with the clumsy, barbarous, and careless Orpington mother, whose bulk and awkwardness is accountable for damage or broken eggs whilst sitting, as well as the treading and injuries caused to many of the chicks in the clutch. The Old English Game, Orpington cross, produces a progeny with close feathers, dense flesh, smaller bone-frame, but broader and deeper breast meat. In flavour, it is far superior to the flesh of the Orpington bird.

Old English Game are very active and agile, ever on the alert to spring, which comes from their pugilistic instinct, and their fighting qualifications bred into them of yore, for game-pit sport; and which is still being transmitted. Therefore, if the gallant game's opponent was at all lacking in alertness, the former would rapidly win

the battle. Hence, that quick side jump and high leap into the air so often witnessed, when a leaf or twig happens to move unawares or suddenly.

It would never be profitable to allow these sportive male birds to mate with, or be at large, where other males are kept, notwithstanding their breed or friendliness, for as sure as figs grow, or pigs grunt, these Old English Game roosters will fight with every cock in the paddock. Eventually, in all probability, a Verdun battlefield might be seen strewn with dead birds, because they fight to the death. Those losses would be greater than all his beautiful plumage, stately carriage, and gamefulness would recoup. The hens are not such destroyers, and can mingle and agree admirably in company with any other family of breeds, and, even when rearing a brood, can mix safely without any harm.

At shows or exhibitions, Old English Game are the gala birds, as compared with the ordinary show game cocks. The breed is remarkable for very short legs; they are not shorter, as compared with some other breeds. The beak, which is rather curved and strong, especially at the base, is the important weapon in the game cock's armoury. The neck is long, far-reaching, and strong, to enable him to utilise his main weapon, the beak. The chest is broad, the body, tapering somewhat like a pear towards tail, is lengthy and powerful, the wings powerful, thighs muscular, short, and wide apart, the shank not flat on the shin, the four toes are long and well spread, the hind ones set well back and flat on the ground. Spurs—sharp, powerful, and set low. The plumage—glossy and fine, hard in handling. Head of medium length; eyes, piercing, quick; neck hackle, long and wiry; back, short, tail, strong; main feathers, broad and curved, and sickles plentiful. The black-breasted have brassy wings, red or ginger-red hackle. The above fowls are rare, though very hardy, and easily reared, and it seems a pity that such elegant birds are not more fully appreciated.

The mating is a problem that requires much study in order to obtain the beauty of feathering, although the virile forces, by the law of transmission, are inherited and transmitted. The 280 egg-laying hen was not reared last year, but by several generations of most careful selection, judicious feeding, and management, for several matings, which laid the foundation broad and deep for the stimulating of the oocytes (ovary) developments that we have in the queens of the egg-layers. But the egg-producing development of Old English Game is still distant, although you have the superb physical and muscular developments which characterise these birds of the highest order, and that is the basic principle for constitutional strength and vim; requirements fulfil all that is lacking in other breeds, and so helpful in the work of crossing.

The foregoing *apercu* is not a bait for folks to rush and purchase Old English Game, to start the prize-pit anew. That is far from my idea. It was purely to write something out of the common; and Old English Game are birds rarely spoken of or written about in this era. The reader may appreciate the breed from a cross fancier's or show point of view, but not the cockpit.

THE MUSCOVY DUCK.

By R. T. G. CAREY (Muscovy Breeder), Beerwah.

Another year has rolled by. How did you fare with your Muscovies? Were you satisfied with the Yuletide values—14s. per pair—or dissatisfied? The enhanced prices were very profitable for the raiser, notwithstanding the high-priced foods. But are you preparing now for the Easter festivals, when the fatted Muscovy duck will realise the values given for the Christmas birds?

All the ducklings now not fully developed must be allowed free range, as the young, tender springing grass caused by the recent rains will help much to lower the food bill, as the youngsters roam hither and thither in search of the juicy insects, thus improving their condition, and considering that there are a few weeks that can be spared before penning up for fattening, consequently a wide scope or range feeding can very well be adopted.

As most of the breeders are now sitting upon the second season's hatch, which will be due about February, our country breeders must be on the lookout for iguanas—very bad enemies, especially for eggs. Therefore these reptiles must be destroyed on sight. See that the broody ducks have comfortable nests, and are well shaded, as well as protected from storms or rain. All future breeders should by this time have been selected and ought now to be penned, they will begin to lay

about now, and many of them ought to be showing the scarlet face which indicates maturity. It is advisable that they produce a batch of eggs and brood before the winter sets in, as the youngsters will be well advanced by that time. Cull them severely, and keep only the choicest over for operations during next spring.

Dispose of all three-year-old breeding ducks, after this breeding season is over, on the Easter markets. "Daddy" drakes, whose usefulness for stud work has become enervated, must also fill the sales crates.

After this, your whole care can be focussed upon the new stock, getting them primed and conditioned for the early hatches of next year's Yule markets, which proved so remunerative last Christmas. The above notes may be a little premature; nevertheless, begin early, hatch early, cull early, and mate up early. Then your duckling may have the chance of a few months of range-feeding, which helps to develop good-sized frames, and produces the prime Christmas and Easter duck.

POULTRY FOR EGG PRODUCTION.

How often have we ("Journal of the Jamaica Agricultural Society") received letters stating that the hens were not laying as the cock was too old, or not of good strain, and asking for reference to secure a cock of good laying strain "to make the hens lay," and although we have often written in the journal that pullets will lay just as well without a cock, the belief still commonly prevails amongst non-readers. Here is a paragraph on the subject from "Farm, Field, and Fireside" (England):—

THE MALE IS SUPERFLUOUS

when breeding operations are not contemplated. It has been proved over and over again that hens will lay just as many eggs without a male consort as with one. The male exercises no influence whatever over the number of eggs laid by hens he may be mated with, but the notion that he does dies hard in many people's minds. It is folly to keep a cock bird where eggs are produced only for consumption, especially where space is limited, and his crowing may be a perpetual nuisance to neighbours. Moreover, he not only occupies the room of another hen, but also eats food in waste. Again, unfertilised eggs keep better, and are preferable for putting down.

TWO METHODS OF PREPARING RABBIT SKINS.

For the information of those who have often asked us for a recipe for curing or tanning rabbit skins, we take two good methods from the "Journal of the Jamaica Agricultural Society."

First Method.—The fur of the common rabbit can be used very successfully at home for several purposes; lining small children's garments, mittens, foot warmers, insoles, &c. Here is a recipe to cure the furs at home:

Tack the furs, when still fresh, on a plank, hair side to the wood. With a knife carefully scrape away all little pieces of skin. Dissolve one teaspoonful of alum and one-half teaspoon salt in one cup of water, and rub this on the skin. Let this stay on one day, then scrape again, and when necessary put on for the third time. When they look clean take them off the plank and with a hammer beat on the hair side till the fur is soft. A little unsalted butter rubbed on the skin side will help this last process.

Second Method.—A popular and satisfactory method of curing rabbit and other small skins is to take saltpetre, one part; alum, two parts; and salt, two parts. Roll as finely as possible with a glass bottle, and mix thoroughly together. Take the skins when quite fresh, or soak well before treatment if dry to begin with, and go over carefully, removing all adhering pieces of flesh or fat. Now coat with the mixture, roll up neatly, and keep in a dry, airy apartment where frost cannot penetrate. Allow of rabbit skins resting ten days, mole skins a week. Now rinse thoroughly to remove all traces of dressing, dry slowly, and manipulate well daily with the fingers to assure suppleness. Another plan is to stretch the skins taut, remove superfluities with white soap, fine pumice-stone and warm water, and dress—applying hot, but not allowing to boil—with a mixture of 2 oz. hard, white soap, 1 oz. salicylic acid, and $\frac{1}{2}$ oz. borax. Apply thoroughly with a paint brush, and again twice at forty-eight hours' interval, dry for a week, and then supple as before.

Dairying.

PROPOSED BUTTER FACTORY AT INNISFAIL.

A meeting of shareholders of the proposed butter factory at Innisfail was held on the 20th December, 1919, when the report of the provisional directors was read by the secretary, Mr. S. K. Page. This report detailed the workings of the scheme as from September, 1918, up to date, and showed that the number of persons who had signed for shares proved that they greatly favoured the establishment of the dairying industry in the district. The site recommended in the report where the factory would be erected was unanimously approved of in every respect, being central and access to the factory very good. As the report showed that the business of initiation of the scheme had been well gone into, nothing now remained but to go right ahead with the erection of the factory. The statement of receipts and expenditure tabled showed a credit balance, and the report as read was received and adopted. The total number of shareholders who had signed up for shares from 10 to 500 was 83.

After some discussion, Mr. F. L. Sugden moved, and Mr. J. Giddens seconded—That a company be registered and called “The Johnstone River Co-operative Butter and Bacon Factory,” with 12,000 shares at £1 each. This was carried unanimously.

The following gentlemen were elected as directors:—Messrs. W. D. Davies, G. Hing, C. C. Collins, J. C. McGrievy, S. Archbold, F. L. Sugden, and S. K. Page.

An informal discussion took place on the necessity for planting grasses suitable to the district, and for observing the proper times and methods of planting different seeds. A vote of thanks to the provisional directors was carried by acclamation.

The full report of the provisional directors included a statement that it was considered that it would cost about £4,000 to build such a factory as would be a credit to the district, and which would give the dairying industry the impetus that it needed. Taking into consideration the number of good grasses that can be grown in the district, and the richness of the soils for cultivation, there was little room for doubt as to the dairying industry being a pronounced success.

ANOTHER CANE-CUTTING INVENTION.

The Hawaiian correspondent of the “Louisiana Planter” writes:—Invention of a mechanical cane cutter which may revolutionise field operations in connection with the harvesting of crops is claimed by V. L. Stevenson, of Hilo, in an article which appeared recently in the “Hilo Post-Herald.” He is applying for a patent for his invention, which is said to be simple, although it took twenty years to perfect. The germ of the idea was obtained in Queensland, and Mr. Stevenson added to his information from the fields of Fiji and later from those of Hawaii. He claims other inventions have gone on the wrong track, and to have been an observer of all such inventions as have been announced. Mr. Stevenson is quoted on the subject, as follows:—

“Everybody who knows anything about sugar plantation work realises that the cost of cutting cane by hand labour is a very large item in the annual expenditure budget. I have invented a machine whereby 90 per cent. of cane cutting labourers will be eliminated. There is no need to say anything more about the proposition. Everybody knows that labour is becoming harder and harder to get, and that mechanical means that will eliminate 90 per cent. of the cane cutters means that millions of dollars will be saved the plantations and homesteaders. That the cane cutter I have invented will be used throughout the entire cane sugar world is a certainty.

“There have been many attempts in the past to produce a machine that would cut cane, but they have all resulted in failure,” the article continues. “The inventors were all men who were engineers without practical experience in the canefields. They overlooked the very important fact that many varieties of cane twist and turn as they grow, and, finally, lie on the ground. The machines invented in the past failed to accomplish anything with the fallen cane, and simply left stumps standing everywhere. Then irrigation ditches and water furrows handicapped the machines to a tremendous extent. There was not one machine that looked promising when it came to a real trial of cane cutting.”

Tropical Industries.

CANE CRUSHED IN THE NORTHERN SUGAR MILLS FOR THE SEASON 1918-1919.

The "Courier" correspondent at Cairns (14th January) gave the following particulars of the quantities of cane crushed during the least season in the Northern sugar mills, the figures for 1918 being given in parentheses:—Mourilyan 63,000 (28,000); Goondi, 68,000 (40,000); South Johnstone, 87,000 (47,000); Mulgrave, 79,000 (56,000); Hambledon, 97,000 (68,000); Mossman, 53,000 (49,000); Babinda, 140,000 (93,000). Totals, 587,000 (381,000). Babinda is the only mill that is still crushing and the above figures are approximate, being based on the crushing at Babinda to date. Magnificent rains have fallen in the whole of the coastal sugar belt during the past week, aggregating up to 8 in., and growers are busily engaged in ploughing, chipping, and planting for the new season, for which the prospects are very bright.

THE CULTIVATION OF SUGAR-CANE IN QUEENSLAND.

By HARRY T. EASTERBY, General Superintendent of the Bureau of Sugar Experiment Stations.

PART VII.

VARIETIES OF CANE.

The subject of cane varieties has been extensively dealt with in Bulletin No. 2 of the above Bureau, copies of which may be had upon application. A few notes, however, upon the subject may prove useful.

The introduction and testing of new varieties is constantly going on at the Sugar Experiment Stations, and growers can obtain such of these as have been thoroughly tested as sugar producers and croppers, and which are free from disease, during the year, by sending in their names and addresses to the Northern, Central, and Southern Sugar Experiment Stations at South Johnstone, Mackay, and Bundaberg, according to the localities in which they live.

The price for sugar-cane paid by the different sugar-mills is fixed by a Local Board or by the Central Cane Prices Board under the Regulation of Sugar Cane Prices Act and is based upon what is known as the commercial cane sugar in the cane, this being determined by analysis at the mill. All cane containing over 7 per cent. of commercial cane sugar cannot be refused. In fixing a price deductions may be allowed in respect of—

- (a) Burnt, frosted, or diseased sugar-cane; or
- (b) Badly-topped or trashy sugar-cane;
- (c) Varieties of sugar-cane, the growing of which is disapproved by the Local Board or by the Central Board.

It will therefore be seen that it is highly important to grow only the best and richest varieties of sugar-cane, and it is on this point that the Sugar Experiment Stations can be of the greatest value to farmers in supplying them with good varieties of cane and keeping them advised as to the analyses of same during different periods of the crushing season.

The following table, containing the analyses of different varieties grown in Queensland, will be of interest to growers as a guide. Those marked with a star are not generally recommended:—

ANALYTICAL DATA OF CANE VARIETIES GROWN COMMERCIALLY IN QUEENSLAND AT THE PRESENT TIME, FOLLOWED BY RECOMMENDATIONS AS TO THE BEST KINDS TO GROW IN THE DIFFERENT SUGAR DISTRICTS.

Variety.	Crop.	Age, Months.	Brix.	Sucrose.		Fibre.	C.C.S.	Arrowing.
					Purity.			
Rappoe, or Rose Bamboo	Plant	19	20.1	17.9	89.0	10.30	14.13	Arrows
	Ratoon	12	18.5	17.2	92.9	11.58	14.74	
Mauritius Ging- ham or Striped Singapore	Plant	16	19.1	17.63	92.3	10.82	14.14	,,
	Ratoon	12	22.8	19.93	87.4	11.78	15.29	
*White Bamboo	Plant	13	19.5	17.90	91.8	12.86	13.98	,,
	Ratoon	12	18.8	17.11	91.0	13.08	13.26	
*Malabar	Plant	19	19.2	17.19	89.5	12.80	13.24	,,
	Ratoon	12	20.9	18.63	89.13	13.72	14.16	
*Daniel Dupont	Plant	15	18.1	15.89	87.79	11.8	12.22	,,
	Ratoon	12	18.15	15.62	86.11	12.62	11.76	
*Otamite	Plant	20	19.70	17.82	90.45	8.84	14.44	,,
	Ratoon	15	18.80	16.13	85.79	9.47	12.55	
*Cheribon	Plant	21	21.70	20.15	92.85	11.02	16.18	,,
	Ratoon	12	17.50	14.30	81.71	11.00	10.58	
Meera	Plant	13	17.9	16.17	93.5	10.21	12.89	Arrows
	Ratoon	12	18.2	17.04	93.6	11.80	13.63	
N.G. 15 or Badila	Plant	11	20.9	19.32	92.44	9.31	15.87	Sparse and late
	..	12	21.2	20.27	95.61	8.42	17.04	
N.G. 15 or Badila	Plant	13	23.0	21.96	95.47	9.62	18.20	,,
	..	14	23.9	22.93	95.94	9.13	20.81	
	..	15	23.9	22.43	93.84	7.30	18.88	
	..	16	22.2	20.58	92.70	7.30	17.21	
	..	18	21.0	19.74	94.0	7.30	16.63	
	..	19	21.8	20.45	93.8	8.00	17.09	
N.G. 16	..	20	23.4	21.99	93.97	9.62	18.06	,,
	..	21	23.1	21.93	94.93	9.62	18.12	
N.G. 22 or Mahoma	Ratoon	10	22.5	21.54	95.70	10.70	17.67	,,
	Plant	12	19.9	18.69	93.72	11.00	15.11	
N.G. 24 or Goru	Ratoon	11	22.3	19.82	88.80	10.60	15.58	,,
	Plant	13	20.7	19.40	93.70	8.88	16.04	
N.G. 24A	Ratoon	12	21.2	19.91	93.90	11.17	16.07	,,
	Plant	17	21.4	20.22	94.40	11.04	16.40	
N.G. 24B	Ratoon	11	21.6	20.27	93.80	11.61	16.27	,,
	Plant	17	20.0	18.47	92.3	11.23	14.75	
N.G. 40	Ratoon	11	21.0	19.74	94.0	11.92	15.81	Sparse
	Plant	23	18.4	16.64	90.4	11.13	13.07	
*N.G. 47	Ratoon	12	18.3	17.22	94.09	9.92	14.11	,,
	Plant	13	20.5	18.00	87.9	11.25	13.94	
*N.G. 48	Ratoon	12	22.1	20.83	91.5	13.56	16.39	,,
	Plant	13	20.3	18.35	90.4	10.70	14.56	
B. 147	Ratoon	12	21.6	19.86	91.9	13.37	15.36	,,
	Plant	13	23.5	21.39	91.0	12.0	17.29	
D. 1135	Ratoon	12	21.4	20.01	93.5	13.08	15.86	,,
	Plant	16	19.47	18.06	92.7	11.00	14.50	
Mauritius Mal- gache	Ratoon	11	18.60	16.93	91.02	11.00	13.44	,,
	Plant	13	20.08	18.22	90.83	10.72	14.48	
Mauritius 1900 Seedling	Ratoon	11	20.84	19.80	95.0	9.94	15.86	,,
	Plant	18	19.30	17.56	90.98	10.81	13.97	
Black Innis or M. 189	Ratoon	12	19.80	18.36	92.72	9.71	14.95	,,
	Plant	18	19.50	17.68	90.66	10.47	14.09	
*H.Q. 5	Ratoon	11	21.20	20.48	96.60	11.21	16.68	,,
	Plant	13	19.10	16.92	88.5	11.69	13.11	

ANALYTICAL DATA OF CANE VARIETIES GROWN, ETC.—*continued.*

Variety.	Crop.	Age, Months.	Brix.	Sucrose.	Purity.	Fibre.	C.C.S.	Arrowing.
H.Q. 10	Plant	13	20.6	19.07	92.5	11.20	15.26	Arrows
	Ratoon	12	20.5	19.15	93.4	11.17	15.41	
	Plant	13	20.1	18.11	90.0	11.37	14.23	
	Ratoon	12	19.3	17.93	92.9	12.61	14.15	
	Plant	13	19.6	17.13	87.4	10.87	13.27	
	Ratoon	12	18.1	16.60	91.7	9.36	13.46	
	Plant	13	18.0	16.01	88.9	9.55	12.74	
	Ratoon	12	19.7	18.56	94.2	10.61	15.08	
	Plant	13	19.4	17.30	89.1	10.59	13.63	
	Ratoon	12	19.5	17.60	90.2	11.05	13.88	
H.Q. 297	Plant	11	20.55	20.05	97.5	10.36	16.69	..
		12	21.30	19.73	92.62	9.63	14.34	
		13	22.25	21.25	94.44	10.60	17.41	
		14	22.10	21.05	95.24	10.39	17.23	
		15	22.8	21.56	94.56	8.56	17.98	
		16	22.7	21.49	94.67	8.56	17.93	
		18	22.9	22.15	96.72	8.56	18.71	
		19	21.8	20.82	95.50	8.56	17.46	
		20	21.0	19.48	92.76	10.60	15.71	
		21	20.6	18.88	91.65	10.60	15.12	
H.Q. 426	Ratoon	12	20.6	19.25	93.44	9.16	15.83	..
	Plant	12	20.2	18.05	89.3	11.0	14.17	
		13	20.55	18.85	91.7	11.0	14.89	
	Plant	12	21.40	20.41	95.37	11.36	16.52	
	Ratoon	13	23.20	21.38	92.10	11.50	16.83	
	Plant	12	19.60	18.69	95.35	12.06	14.97	
	Ratoon	12	22.40	20.48	91.40	12.84	15.78	
	Plant	12	19.80	18.76	94.70	13.00	14.80	
	Ratoon	12	22.10	20.45	92.50	10.00	16.48	
	Plant	12	18.20	16.25	89.28	9.36	13.00	
Q. 116	Ratoon	12	21.00	19.14	91.10	10.38	15.24	..
	Plant	12	19.40	18.27	94.17	12.14	14.52	
	Ratoon	12	22.01	19.87	90.30	13.61	14.98	
	Plant	12	20.10	18.89	93.98	8.12	15.65	
	Ratoon	12	22.10	20.34	92.00	11.34	16.10	
	Plant	12	18.50	15.55	84.05	8.97	11.90	
	Ratoon	12	21.60	18.91	87.50	8.98	14.90	
	Plant	12	20.30	19.30	95.07	10.22	15.78	
	Ratoon	12	21.00	19.26	91.71	11.74	15.09	
	Plant	12	21.10	19.93	94.45	10.29	16.27	
Gingila	Ratoon	12	22.30	20.79	93.23	9.96	16.80	..
	Plant	12	20.30	19.41	95.61	9.38	16.10	
	Ratoon	12	19.30	18.35	95.07	8.14	15.38	
	Plant	12	21.20	20.19	95.23	9.44	16.70	
	Ratoon	12	22.00	20.82	94.63	9.06	17.19	
	Ratoon	13	19.80	18.23	92.07	10.00	14.63	Arrows
	Ratoon	13	18.30	15.88	85.13	9.69	12.18	
	Ratoon	13	19.20	17.19	89.53	9.70	13.56	
Shahjahanpur No. 10	Plant	13	23.00	21.27	92.50	13.60	16.38	..
	Plant	13	19.30	17.21	88.90	..	13.36	
H.Q. 458	Plant	13	19.30	17.21	88.90	..	13.36	..

B. 208 has not been included in the above table, for the reason that it has contracted disease in so many districts that it is rapidly going out of cultivation. Rappoe (Rose bamboo) and Striped Singapore still grow well on newer lands, but on older cane soils these varieties have been practically abandoned. In order that, if possible, they may be reinvigorated and become useful canes again, they are now being grown on an elevated situation on the tablelands near Cairns. From this spot they will ultimately be distributed to canegrowers by the Sugar Bureau.

RECOMMENDATIONS AS TO VARIETIES OF CANE CONSIDERED THE MOST
SUITABLE FOR THE DIFFERENT SUGAR DISTRICTS.

MOSSMAN.—N.G. 15 (Badila), 24 (Goru), 24A, 24B; D. 1135, H.Q. 426, Black Innis, B. 147, Q. 813, 903, 970, 1121, 1092, H.Q. 458.

CAIRNS.—N.G. 15, 24, 24A, 24B; D. 1135, H.Q. 426, B. 147, Q. 813, 903, 970, 1121, 1092.

JOHNSTONE RIVER.—N.G. 15, 24, 24A, 24B; D. 1135, H.Q. 426, B. 147, Malagache, H.Q. 458, Q. 813, 903, 970, 1121, 1092, 855.

HERBERT RIVER.—N.G. 15, 24, 24A, 24B; D. 1135, H.Q. 426, B. 147, Rappoe (on new lands), Q. 813, 970, 903, 1121, 1092, H.Q. 458.

LOWER BURDEKIN.—N.G. 15, 24, 24A, 24B; D. 1135, H.Q. 426, 1900 Seedling, N.G. 22 (Mahona), Black Innis, H.Q. 222, Gingila, Q. 813, 855, 970, 903, 1121, 1092, H.Q. 458.

PROSERPINE.—N.G. 15, 24, 24A, 24B; D. 1135, H.Q. 426, 1900 Seedling, N.G. 22 (Mahona), Black Innis, Gingila, Malagache, H.Q. 222, Q. 116, D. 1135, B. 147, Q. 813, 903, 970, 855, 1092, 1121, H.Q. 458.

MACKAY.—N.G. 15, 24, 24A, 24B; D. 1135, H.Q. 426, 1900 Seedling, Black Innis, Malagache, H.Q. 5, 114, 222, Q. 116, Gingila, B. 147, Q. 813, 903, 970, 1092, 1121, 855.

BUNDABERG AND CHILDERS.—N.G. 15, D. 1135, Black Innis, 1900 Seedling, Malagache; H.Q. 222, 285, 297; Q. 116, H.Q. 426, Rappoe and Striped Singapore (on new soils), N.G. 40, N.G. 22 (Mahona), Q. 813, 855, 903, 970, 1092, 1121, H.Q. 285, Shahjahanpur No. 10.

MARYBOROUGH, BAUPLE, AND PIALBA.—N.G. 15, D. 1135, Black Innis, 1900 Seedling, Malagache; H.Q. 222, 285, 297; Q. 116, H.Q. 426, Rappoe and Striped Singapore, N.G. 22 (Mahona), N.G. 40, B. 147, Q. 813, 855, 903, 970, 1092, 1121, H.Q. 285, Shahjahanpur No. 10.

MORETON.—N.G. 15, D. 1135, 1900 Seedling, Black Innis, Malagache; H.Q. 222, 285, 297, 426; Rappoe and Striped Singapore, N.G. 22 (Mahona), N.G. 16, White Bamboo, Q. 813, 855, 903, 970, 1092, 1121, Shahjahanpur No. 10.

LOGAN AND NERANG.—N.G. 15, 24, 24A, 24B; 1900 Seedling, Black Innis, D. 1135, H.Q. 285 and 426, Rappoe, Striped Singapore, Malagache, N.G. 22 (Mahona), Q. 813, 855, 903, 970, 1121, Shahjahanpur No. 10.

WEATHER CONDITIONS.

Hot, humid conditions are the best for the sugar-cane plant, and, fortunately, these generally obtain during the period of the maximum growth of the crop in Queensland. The wet season is usually synonymous with the three hot summer months of January, February, and March.

Although the weather is hot and humid during this period, the higher temperatures experienced in the dryer belts of Australia are not common. A temperature of 100 degrees is rarely recorded. It is unusual for the thermometer to show much above 90 degrees, even in the middle of summer. Indeed, during times of heavy rain, the weather becomes comparatively cool, but as soon as the sun reappears, the atmosphere becomes steamy and the growth of the cane is vigorously promoted.

On the coast of Queensland, where sugar is grown, the greatest rainfalls occur where the mountain ranges come close into the coast. Where they are considerably distant, as at Bundaberg and Ayr, the lowest precipitations take place. Consequently, the greatest amount of rain falls at Babinda and Innisfail, where the lofty ranges of Bartle Frere and Bellenden Ker are not far from the seaboard.

The following table shows the average annual rainfall in each of the sugar districts:—

District.	Average Annual Rainfall in Inches and Hundredths.	District.	Average Annual Rainfall in Inches and Hundredths.
Mossman	82.91	Proserpine	76.96
Cairns	90.49	Mackay	68.52
Mulgrave	81.91	Bundaberg	44.40
Babinda	165.00	Gin Gin	37.71
Innisfail	149.20	Childers	42.07
Ingham	80.53	Maryborough	46.14
Halifax	89.17	Pialba	38.04
Ayr	44.48	Nambour	60.93
Bowen	40.60	Beenleigh	48.87

Exceptionally heavy rains occur at periods that cause severe floods over the cane in low-lying areas. If the water subsides within two or three days, little damage may be done, but should rain continue and the cane remain under water for a week or more, the crop is often lost.

HUMIDITY.

The mean relative humidity or percentage of moisture in the air is a most important factor in the growth of cane. This is determined from the readings of the thermometer known as the "dry" and "wet" bulb. The dry bulb shows the external shade temperature of the air, while the wet bulb shows the external shade temperature of evaporation, and is kept covered by wet muslin attached to a reservoir of water by strands of cotton which keep the muslin supplied by capillary attraction. When the wet bulb under these conditions reads over 80 degrees the weather is exceedingly oppressive, and should it go up to 88 degrees it is regarded as highly prejudicial to human life. The table hereunder gives the percentage of relative humidity in the principal coastal towns in the sugar districts at 9 a.m.:—

Place.	Percentage of Humidity.	Place.	Percentage of Humidity.
Bundaberg	69.0	Innisfail	80.0
Mackay	75.0	Cairns	70.2
Ayr	68.0		

FROSTS.

These principally do damage to sugar-cane in those districts from Mackay southward. More or less severe frosts occur every few years in the Bundaberg, Gin Gin, Maryborough, Mount Bauple, and Nambour

districts, while parts of the Mackay district are occasionally affected. In exceptionally cold seasons, frosts have done damage at Proserpine and Ayr, and traces of frost in such years have been detected as far North as Cairns, though, of course, no injury has been done the cane. When cane is badly damaged by frost, the whole of the leaves become dry and yellow and fermentation sets in down the stick, killing off the eyes. Unless such cane is quickly harvested and sent to a mill, deterioration sets in rapidly, the commercial cane sugar is greatly reduced, and it soon becomes unfit for manufacture. If possible, therefore, when cane becomes frosted, immediate arrangements should be made for its crushing.

DROUGHTS.

These rarely occur in the Northern sugar districts, and then only in a modified form. In some of the Southern sugar districts they take place periodically, and the only cure is an irrigation system.

CYCLONES AND HIGH WINDS.

Apart from damage caused by frosts, prolonged drought, or excessive wet, cane crops on the Queensland coast are subject to high winds. This naturally leads to much evaporation of surface moisture, although, as pointed out by Deere, winds blowing from the sea are often laden with moisture, increasing the humidity of the atmosphere and lessening the tendency to soil evaporation.

Hurricanes and severe blows are not infrequent, and may lead to partial destruction of both cane and leaves. The two cyclones which visited the canegrowing districts of Mackay and Innisfail in the early part of 1918 will be long remembered. Enormous damage was done to the cane crops.

The general effect of severe blows is to break the sticks if they have made much growth. In other cases the canes are twisted, which promotes shooting at the eyes. Leaves become stripped and torn and fail to be of the greatest benefit to the plant.

PESTS AND DISEASES OF CANE.

The sugar-cane plant is subject to many pests and diseases. The most serious of these at the present time is what is known as the grub pest. "The Grub" is the popular name given to the larvae of the cane beetle. There are many kinds of cane beetles, probably about thirty, and of these four or five are more or less common. The eggs of the beetle are deposited in the soil about the cane and hatch into the grub, which commences feeding on the roots of the cane plant, doing in many cases an immense amount of damage by causing the stool to ultimately fall and perish. Thousands of tons of cane, particularly in the North, have been destroyed every year, and a high price per lb. is now paid for the beetles and grubs. In Mackay, over 15 tons of beetles have been captured within so short a time as two months, and destroyed.

This great pest is, at the present time, being investigated by Dr. Illingworth and a staff of assistants at Meringa, near Cairns, North Queensland, and conclusions are being arrived at as to the best methods of coping with the menace to growers. Various poisons have been used with more or less success, the use of arsenic having, so far, been attended with good results. It will be necessary to wait, however, till Dr. Illingworth's experiments are completed before definite conclusions can be arrived at.

BEETLE BORER PEST OF SUGAR-CANE.

The beetle borer or weevil borer, sometimes called New Guinea borer, has, during the last few years, done an enormous amount of damage, principally about Babinda and Innisfail, to the Badila cane. This weevil lays its eggs on the cane plant from which hatch out the grub or borer. This attacks the cane by boring into it, frequently making tunnels 18 inches or more in length, which it fills with chewed cane fibre and excreta. The grub is about half an inch long, and, when moving, forms a hump on its back; the head is brown. A description of the grub and beetle will be found in Bulletin No. 3 of the Division of Entomology of this Bureau, "Notes on Insects damaging Sugar-cane in Queensland," by Edmund Jarvis, copies of which may be had on application. The grub spins a cocoon of cane fibre, but previous to so doing, it eats a large hole in the rind of the cane to enable it to emerge. The pest is kept in check in Hawaii by means of a parasite known as the Tachinid fly. This fly has been liberated in North Queensland by the Entomologist, Dr. Illingworth. Unfortunately, the parasite has other enemies in the shape of spiders and ants. It is hoped, however, that the flies will ultimately render a good account of themselves.

The methods of minimising the borer pest usually recommended are—

- (a) The immediate ploughing out of the stools from land which is to be spelt before replanting. These stools should be cut up and burnt;
- (b) The immediate burning of the trash after harvesting;
- (c) The most stringent inspection of cane plants or sets before planting;
- (d) The collection of beetles (by means of traps of cut cane) and their destruction.

MOTH BORER.

The moth borer is also a pest of sugar-cane, but the amount of damage done has so far been comparatively light. The larvae of this borer usually attack very young cane and kill the "heart." Where this is seen dying, the cane plant should be cut low down and the borer located and killed, as it frequently passes from plant to plant.

Other insects damaging sugar-cane will be found described in a Bulletin by Mr. Edmund Jarvis, which may be obtained free at the office of the Bureau of Sugar Experiment Stations, Brisbane.

OTHER DISEASES.

The gumming disease of the cane, caused by *Bacillus vascularum* (Cobb), is at times a very serious trouble, both in the field and in the mill, but, so far as the writer's experience goes, gumming of the cane is not found to any extent north of Mackay, and appears most prevalent in cooler climates. Sets showing gum should never be planted. Certain varieties of cane, particularly the older sorts, such as Rose Bamboo and Striped Singapore, are particularly liable to the disease, while in the best of the New Guinea canes no traces of it have been found, though the poorer kinds are far from immune.

Nematodes and fungoid diseases attacking roots have also caused alarm in places. The liming of the soil, change of plants, and rotation of crops, are the surest and safest methods for the elimination of these troubles.

[THE END.]

PROSPECTS OF THE CANE CROP IN THE NORTH.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Field Assistant, Mr. J. C. Murray:—

“Throughout the month the cane-growing areas of Millbank, Bingera, Gin Gin, Maroondan, Avondale, and Bucca have been visited.

“MILLBANK.

“There is a marked absence of cane pests in this locality, and if the growers cultivate energetically now that the rain has come they will probably find that the heavier soil prevailing on the river bank will respond quicker than the volcanic of the Woongarra.

“It is hardly likely that the ratoons in these areas will come again to any extent, but the early plant cane should produce a fair crop for 1921. Farming operations were at a standstill during the early part of the month, but probably ere this the farmers are going ahead with planting.

“BINGERA.

“Great difficulty is being experienced by the growers in obtaining plants, those that are successful paying a very high price for them. There has been no change in the staple varieties grown, the farmers evidently considering that so far they are as satisfactory as any offering.

“GIN GIN.

“Splendid rain had fallen at the time of visiting Gin Gin, and the cane was just beginning to look bright and healthy.

“The D. 1135 is about the most hardy variety growing, although Clark's Seedling, under drought conditions, did fairly well. It is doubtful, however, whether any variety would have been alive had the drought lasted a month or so longer.

“As the rain was still persisting at the time of inspecting the Gin Gin areas farmers were taking the occasional hours of sunshine and getting on with their ploughing. With regard to agricultural operations, it was noticeable that the growers usually plough twice, let the land stand for about three weeks, plough again, harrow, drill, and plant. Generally plants with three good eyes are selected and placed in the soil, if a red volcanic, about 16 inches apart. Planting is usually closer if the soils are dark and heavier in humus. Usually speaking it takes about 16 cwt. of plants to go over an acre, but this depends on the nearness of the plant, a factor usually

determined by the nature of the soil. The cane planter is almost invariably used. Subsequent cultivation of the cane after it has appeared above ground is usually carried on by machines fitted with hoes in preference to the disc. These remarks with regard to cultivation and ploughing apply practically to all the areas visited this month.

“MAROONDAN.

“The cane appears to have revived wonderfully after the rain, and should give a good yield of cane in 1921. No doubt, as soon as the weather clears sufficiently, the farmers will be hard at work preparing for the planting.

“AVONDALE.

“On the plantation side the cane looks well and Messrs. Young Bros. are energetically cultivating and ploughing. Most of the men engaged on the plantation are returned soldiers, who are working well and intelligently. With regard to varieties, Yuba has practically displaced the other canes, and seems to do very well on the river flats or sandy loam country. Nut grass is a considerable nuisance, although it is by no means out of hand. With regard to farm work, horses are mostly used for the ploughing, and the usual types of farm implements employed. Mr. Leaper assures me that excellent results are obtained from the use of the sulky plough.

“BUCCA.

“This place presents a most pleasing contrast to the time of last visiting. All the hills and valleys are clothed with heavy grass, and the cane is everywhere brightening up. Several growers were busy preparing for planting, but numbers have bought cows and are going in for dairying. Of the varieties that appear to make most headway in the district, D. 1135, Rappoe, and 1900 seem to be doing best. These canes tested a few years back 16.32, 16, and 17.05 respectively. It will be seen by these tests that cane grown here has a high sugar content.”

RARE SUGAR FOUND IN HONEY.

Although known to occur in various forms, even, perhaps, as one of the constituents of the manna of Scripture, Melezitose is one of the rarest sugars. Minute quantities of it have been available to scientists for many years, but the supply has never been sufficient to permit of extensive experimentation. Now, by the aid of some Pennsylvania bees, many of which lost their lives, the United States Department of Agriculture has several kilograms of this rare substance, extracted and purified in the Bureau of Chemistry.

The bees in certain sections of Pennsylvania were storing up honey that crystallised, with the result that in the following winter seasons the bees were not able to digest it, and starved. The crystallised substance in the honey was found to be melezitose, which derives its name from *melez*, the French name for the larch tree, on which it was originally discovered in the form of honeydew. It also occurs in a sugary encrustation, or manna, on a leguminous tree in Persia and adjoining countries. Recently it has been found by the Bureau of Chemistry in a similar product on the Douglas fir in British Columbia. And now it has turned up in Pennsylvania, stored away in the honeycomb, in numerous hives. In this instance the following origin of the substance has been worked out:—

The scrub pine, and rarely other species of pine, are subject to attack by a plant louse and by a scale insect. In the course of their life activities these insects produce a honeydew which is rich in melezitose. In dry summers, after the white clover flowers have ceased to yield honey, the bees turn to this honeydew, and collect it; but it crystallises as fast as they store it away. This occurred in 1917 and 1918, and considerable losses were suffered by beekeepers. In 1919 the weather was so moist during July that no melezitose was gathered by the bees at all. But it probably will be collected in future whenever the summer is dry; and the honey of Central Pennsylvania may afford a permanent source of sugar previously so rare as to be only imperfectly known. The Bureau of Chemistry extracted considerable quantities from the honey of 1917 and 1918, and is making extensive experiments with it. Rare as it has always been, there is a definite demand for melezitose for use in scientific laboratories. It can be distinguished from other sugars by certain peculiarities of crystallisation observable with the polarising microscope.—“Weekly News Letter,” Washington, U.S.A.

The Orchard.

WALNUT-GROWING IN CALIFORNIA.

We have received from Mr. H. C. Kegley, Los Angeles, California, an exhaustive and informative paper on the cultivation of walnuts in California, and regret that our limited space will not admit of its publication as a whole.

That walnuts will grow, thrive, and produce heavy crops has long ago been satisfactorily proved on the Darling Downs, and we know of one tree, situated at the lodge gates of the Toowoomba Grammar School, which produced annually a heavy crop of nuts. The Pecan nut, which we take to be a kind of walnut, does equally well on the Downs. Had walnut trees been liberally planted by the early settlers in that district, there would have been no need to import nuts from Europe which have lost most of the attributes of the freshly-gathered fruit.

The chemical analysis has shown that a pound of walnuts contains more proteins than a pound of wheaten flour or potatoes, more fats and carbohydrates than a pound of beefsteak, more fuel value than a like amount of either, and a much smaller percentage of water. It is stated that in California there are now upwards of 60,000 acres of walnuts in bearing.

Walnuts come into bearing at from five to nine years after planting. On account of the wide spread of the full-grown tree, they are usually planted about 17 to the acre, or 60 feet apart in the row. There are groves in California which produce more than 2,000 lb. of marketable walnuts to the acre each year, and the average yield for the whole State in 1918 was 1,300 lb. from twelve-year-old trees. The writer then goes on to give the cost of planting, cultivation, fertilising, pruning, harvesting, &c., which is reckoned at from £8 to £12 per acre.

An idea of the vastness of the walnut business in California may be gained from the fact that last year's crop amounted to 37,000,000 lb. A full description of the machinery employed for husking and cracking the nuts is also given. Singularly enough, prior to the war cornmeal and other finely-ground products were being used by high-explosive makers in the manufacture of dynamite, &c. An experimental grinding machine was devised to reduce walnut shells to a powder which would take the place of cornmeal. Forty thousand dollars (£8,000) were spent by a powder concern on this machine, and it now buys all the shells turned out from a walnut by-product factory at 10 dollars (£2) per ton. The walnut industry of California is growing at the rate of about 2,500 acres per year.

Mr. Kegley also sent us seven very fine photographs illustrating the industry, which we should have been glad to reproduce.

KILLING RABBITS WITH GASES FROM MOTOR-CAR.

A recent report in this paper, explaining how Mr. Walter Hawker, of South Australia, had exterminated rabbits by utilising the exhaust gases of a motor-car, led Major C. Mills, of the "Panshanger" Estate, Northern Tasmania, to experiment with the same means. He took the silencer off the car, connected about 8 ft. of galvanised iron piping to the exhaust pipe, and to the end of that attached 18 ft. of $1\frac{1}{2}$ in. suction hose, which was placed in the burrow, and the mouth of the latter closed up with sand. The throttle of the engine was opened one-quarter, and in a few seconds gas appeared from several holes in the ground. These were stopped, and the engine allowed to run for three minutes. After a further two minutes the burrow was dug out, and five dead rabbits were found. After trying the method for ten days Major Mills found that not one of the gassed burrows had been reopened by the rabbits. He used a six-cylinder car, and considers it an economical and effective way of dealing with the pest. He advises that all holes of a burrow should not be closed up entirely, as otherwise the gases might not extend to the extreme end of the warren. To increase the volume of smoke he cut a small hole in the exhaust pipe, and squirted in a little crude oil.—"Pastoral Review."

Botany.

TWO NATIVE DROUGHT-RESISTANT FODDER PLANTS.

By C. T. WHITE, F.L.S., Government Botanist.

PSORALEA TENAX, Lindl. A "Wild Lucerne."

Mr. W. B. Wilson in a letter under date of 1st December, 1919, from St. Ruth, Dalby, wrote—"I forward under separate cover a specimen of a plant which is growing on St. Ruth, and which I am anxious to know more about. We call it 'Wild Lucerne,' and it is growing well now, although the country is drought-stricken; it did the same in the 1915 drought, and my stock horses and cattle trimmed it all down eventually. There is dry grass in some paddocks with this plant, and my horses seem to mix the two, and as a result they are in tip-top condition and as glossy in their coats as if on grain. A taproot goes straight down for several feet, and the plant seems to spring out of the crown every year and also to keep shooting out as it is fed down—the same as lucerne." Later (11th December, 1919) he wrote—"If I had this plant growing all over the run at present, the dry weather would not worry me so much, as its growth is wonderful, and this is no doubt accounted for by the length of the taproot."

A few notes on the genus *Psoralea* will be found in a previous article in this Journal for December, 1918, in which attention is drawn to the fodder value of another species—*P. cinerea*.

Psoralea tenax is an inhabitant more especially of the heavy blacksoil country of the Darling Downs, but is also found on the coast, though the coastal forms are usually more straggly and weaker in growth than the inland ones.

GALACTIA TENUIFLORA, Willd.

Writing under date of 25th November, 1919, from Meadowbank Station, Mount Garnet, N.Q., Mr. L. Illin, in a letter to the Minister for Agriculture (Hon. W. N. Gillies), stated—

"I am living in a drought-stricken area (Mount Garnet district), and all around cattle are perishing in hundreds, the grass is as dry as powder and straw. Yet, in the middle of this dry straw, you can sometimes see a green patch. If you drive cattle you will notice them going for every plant they can find, and eat it with avidity. The horses will pull the reins out of a man's hands; and, never mind how you urge them on, they must have a mouthful of it. The vines make splendid hay as good as lucerne. I have noticed its growth, and we have only had 8 points of rain since July. I think this plant is a means of increasing settlement and production of stock. I have seen one of the vines inside of a tank fence away from stocks' reach several pounds in weight on the one taproot. A native plant of the district, if it lends itself to cultivation, should prove a greater success than an imported one."

Galactia is a genus of about fifty species, mostly natives of America. Our species (*G. tenuiflora*) has a very wide geographical range, being found in one form or another throughout Tropical Asia, Africa, and America. J. G. Smith, in Bulletin No. 2, Division of Agrostology, United States Department of Agriculture, records the genus as containing several valuable fodders, one (*G. canescens*, the Miller Bean) being particularly valuable for arid regions.

Considerable interest is now being taken in native fodder plants, particularly those of a drought-resistant nature, and the above notes on two such plants seem worthy of record. The accompanying illustrations should aid persons interested in recognising the two plants referred to, should they come across them at any time, or should they have them growing on their properties.



PLATE 6.—*PSORALEA TENAX*.—A “Wild Lucerne,” also called “Emu Grass”

A. A shoot (natural size). B. Calyx and pod (enlarged).

C. Pod (natural size). D. Pod (enlarged).

The pod contains one seed, which fills the whole of it.

PLATE 7.—*GALACHA TENUIFLORA.*

A useful forage vine. The specimens figured represent rather a broad leaved form of the species.

Forestry.

KILLING TIMBER WITH ARSENIC.

The use of chemicals for the destruction of undesirable timber on agricultural selections has been advocated by some and condemned by others. Here is the experience of Mr. E. E. Ward, Wattle Park, who writes (2nd February, 1920):—

“During the last month I have had several inquiries regarding arsenic for killing timber, as I have been trying it in various ways for the last four years; and, perhaps, my experience may be of use to readers of the ‘Queensland Agricultural Journal.’

“I have had a variety of timber, such as box, yellow jacket, broad- and narrow-leaved ironbark, and various kinds of scrub, including a species of wattle which is very hard to get rid of in this country, and I have found the arsenic a decided success. Under favourable conditions, it will kill 98 per cent. of the trees operated on; and under very bad conditions, such as a dry season, and with such timber as small box seedlings up to 6 inches in diameter, which had been scorched by a bush fire going through it, yet on the application of the arsenic 90 per cent. died, and only a small percentage of those that suckered threw out healthy ones.

“In my experience, the best way to use the arsenic is to use 1 lb. more than has been recommended by the department. In mixing a 10-gallon lot, see that the arsenic is thoroughly dissolved, and do not trust a boy to make the solution or apply it, as, in my experience, it is on the thoroughness with which this part of the operation is done that the success or failure of the operation depends.

“My plan is to cut down anything that can be easily felled with four or less axe chops, and spray the sapwood and bark of the stump cut off, say, 6 inches above the ground. With bigger timber I frill-ring it about 6 inches above ground, but do not wrench the chip out any more than necessary to make an opening for the arsenic solution. By wrenching the chip too much the bark is split, and a certain amount of the solution is lost. The solution must be applied all round the tree and the cuts well wetted. Don’t try to get over too much ground, but do the job thoroughly. Should any of your readers wish for further information, I shall be very willing to give them the benefit of my experience, as I have had excellent results.”

AN INCH OF RAIN.

What does an inch of rain mean? Few persons have any definite idea. An acre, if calculated out, will prove to be 6,272,640 square inches. One inch deep of water on this acre will be as many cubic inches of water, which, at 231 to the gallon is equal to 27,154 gallons. This immense quantity of water will weigh 228,190 lb., or 114 tons. One hundredth of an inch (.01) alone is equal to over 1 ton of water to the acre. Inches, and fractions of an inch, are represented by a whole number, say, 1 or more. To denote the fraction, a full stop follows the whole number, thus 1., and the figures representing the fraction then follow. One and a-quarter inches is written 1.25; one and a-half inches, 1.50; one and three-quarters, 1.75, and so on up to 100, which makes the second inch. One inch of water equals over 100 tons per acre. During the month of January, 1901, there fell, at Geraldton, in forty-eight hours, 15½ inches of rain. This was equal to 420,837 gallons per acre, or 1,767 tons, about one-seventh of the total quantity required to irrigate a crop of sugar-cane during the whole growing season.

Neglected Industries.

SILKWORMS.

Last January a letter appeared in one of the Brisbane newspapers advocating the use of the Eri silkworm as the most suitable, both as regards silk production and feeding, for establishing the silk industry in Queensland. Apart from the value of Eri silk, a great advantage is, that instead of feeding on mulberry leaves, its principal food is the castor-oil plant, which grows in profusion all the year round in the coastal districts of Queensland, and thus provides, all the year round, abundance of cheap food, when the mulberry leaves required for the ordinary silkworms which have been raised in Queensland are unobtainable.

There are three descriptions of silkworms which, as far we know, have never been introduced to the State. These are mainly raised in India, under the names of Muga (*Antherea assama*), the Tusser (*Antherea mylitta*), and the Eri (*Attacus ricini*).

THE TUSSER.

The Tusser is a bi-voltine silkworm—that is to say, it goes through all its metamorphoses twice in the year. These worms are also semi-domesticated, or, in other words, the eggs are hatched indoors, the worms then being allowed to feed on the trees by themselves, instead of on leaves plucked for them.

In India, the first generation of moths emerges from the cocoons about the beginning of the rainy season (June), from cocoons which have lain dormant since the previous autumn, and lay their eggs; the caterpillars from these eggs complete their cocoons, and the moths emerge about August. The offspring of these moths produce the second crop of cocoons by the end of the rainy season (September), and these cocoons remain dormant throughout the winter, a period of over seven months, and produce moths in the following June, and so the cycle goes on.

The worms hatch out about the ninth day. They live and feed from about thirty to forty days, passing through five moults, or changing of the skin, at intervals of five to eight days, then spin their cocoons, and finally, after seventy-one days from the commencement of spinning the cocoon, the moth cuts out.

The caterpillars, at the end of their larval existence, are usually about 7 inches in length. The cocoons are very compact in structure, containing a very large amount of a coarse, buff-coloured silk, and of immense size, reaching as much as $2\frac{1}{2}$ inches in length by about $1\frac{1}{2}$ inches in diameter.

The Tusser worm feeds on a variety of plants, some of which are plentiful in Queensland. The two principal ones are *Shorea robusta* and *Terminalia tomentosa*; the latter only is found in Queensland. Of the Terminalias, or allied plants, we have several, especially in the North of the State, all of which are suitable for food, and many others too numerous to mention. Lastly, there is the common castor-oil plant.

In India, the Tusser worm is allowed to feed on the trees out of doors, but a constant watch has to be kept to keep off birds and insects. It is possible to rear these worms entirely indoors, if they are copiously watered once a day with a watering can to imitate the heavy monsoonal rains. Plates 8 and 9 are very good illustrations of the Tusser male and female moths, and of the cocoon and worm.

THE MUGA.

Like the Tusser, the Muga is a semi-domesticated silkworm, but very much more so, as the eggs are hatched indoors, and the cocoons spun indoors also, the worms only being allowed to feed in the open, and brought indoors when about to commence spinning. They are then placed on bundles of twigs prepared for the purpose. It is

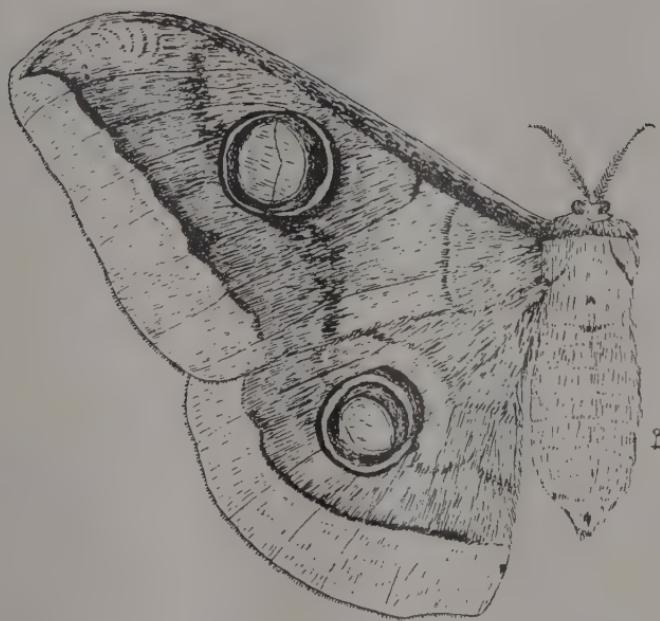


PLATE 8.—TUSSER MALE AND FEMALE MOTHS.



PLATE 9.—TUSSER COCOON AND WORM.

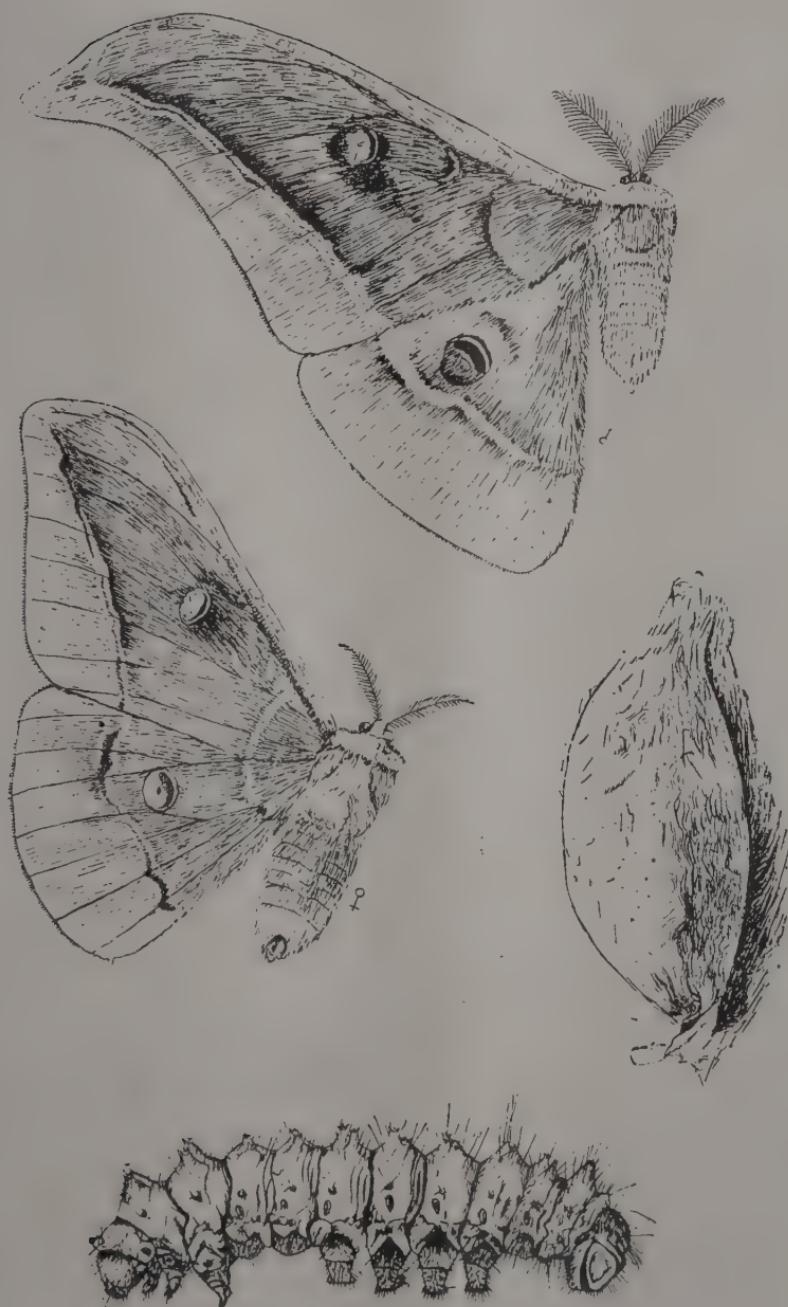


PLATE 10.—MUGA MALE AND FEMALE MOTHS, COCOON, AND WORM.

believed that the worm can be entirely reared indoors. The Muga worm moults four times, and takes from thirty to forty days, according to temperature, to reach the spinning period. The chrysalis stage lasts from fifteen to thirty days, a complete generation occupying from two to three months, according as the weather is warm or cold. The Muga is a multi-voltine worm, usually going through five generations during the year. Each female moth produces about 250 eggs. The full-grown worm measures about 5 inches in length, and is about as thick as the forefinger. Its colour is green. The cocoon is nearly 3 inches in length by about 1 inch in diameter. The silk is much more valuable than that of the Tusser, and there is a considerable demand for it in Europe.

The Muga silkworm's favourite diet, and chief food, consists of the leaves of *Machilus odoratissima*, which is not found in Queensland, although there are several allied plants known as Laurina, which would doubtless do as well. *Tetranthera monoptala* is one of them, and another is the *Sarcostemma brevistigma*, found all over Queensland growing amongst the mangroves or near the beach, its common name being "Caustic Vine." The castor-oil plant is also used. The worms are raised in a similar manner to that described under "Tusser."

Plate 10 illustrates the Muga male and female moths, cocoon, and worm.

THE ERI.

The Eri is a multi-voltine silkworm, reared entirely indoors in a similar manner to the ordinary mulberry worm. Although as many as eight generations can be gone through in a year, not more than five are usually reared. The female moth lays about 200 eggs, which, in favourable weather, hatch out in about ten days from the date of being laid, and a month from hatching sees the worm full grown—during this period passing through four moults—when it commences spinning its cocoons. The moth emerges in from about two weeks to one month, according to temperature. The worm, on hatching out, is about $\frac{1}{2}$ inch in length, and appears nearly black. As the worm grows, the colour changes with each moult, ending in a dirty white or dark green. The full-grown worm is $3\frac{1}{2}$ inches long. The cocoon is $1\frac{1}{2}$ inch long by $\frac{1}{2}$ inch in diameter, of a white colour, although sometimes worms of the same brood, fed on the same food, will turn out brownish-red cocoons. The cocoon is somewhat loose in texture, but the silk is very strong.

The principal food of the Eri is the common castor-oil plant. It also feeds on the leaves of the umbrella tree of North Queensland, on the physic nut plant, and the *Ziziphus jujuba*.

A well-developed castor-oil plant will, after a season's growth, yield 14 lb. of leaves, so that an acre containing 2,732 plants, will supply 38,300 lb. of leaves, sufficient to feed 600,000 silkworms in a season.

The value of Eri cocoons has risen considerably, and the demand in England is greater than the supply. The cocoon, before the Great War, was worth 3s. per lb. dried, and, what is of great importance, no exception is taken to pierced cocoons—indeed, these latter are preferred, as there is no need to choke the chrysalis, as in the case of the mulberry silkworm.

Plate 11 is a good illustration of the Eri male and female moths, cocoon, and worm.

As stated, 1 acre of castor-oil plants will support 600,000 Eri silkworms during the year—that is, six broods of 100,000 each. Allowing for deaths, &c., these will produce 450,000 cocoons. One thousand six hundred cocoons go to the lb.; therefore, 1 acre of land will produce 300 lb., which, at 3s. per lb., amounts to £45. Roughly speaking, to put 1 acre under castor-oil, and to rear the worms, should not cost more than £15, leaving a net profit of £30 per acre. There is no work connected with silkworm rearing which cannot be done by women and children, once the castor-oil has been planted.

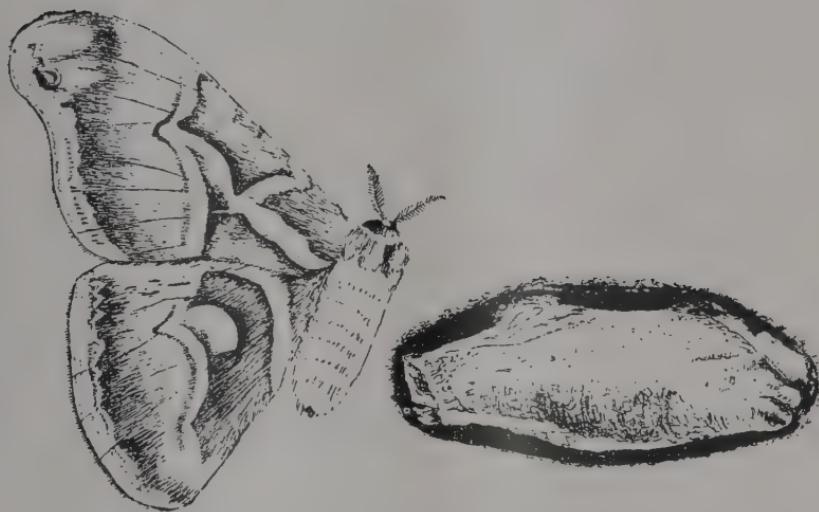


PLATE 11.—ERI MALE AND FEMALE MOTHS, COCOON, AND WORM.



Entomology.

CANE GRUB INVESTIGATION.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon Cane Grub Investigation, January, 1920, from Dr. J. F. Illingworth, Entomologist to the Bureau:—

“Rains have set in at last in the Cairns district. The terrible drought continued until the 13th of January, with fatal results in some of our cane areas. The high-lying ground composed of red soils suffered most, since this land is naturally dry; and the ratoon stumps have many of their roots destroyed by former attacks of grubs. Most plant-cane, where it has been well cultivated, resisted the drought remarkably, though there has been no appreciable growth. Naturally, we must expect a late-maturing crop next season, with a considerable shortage.

“The continued dry weather has increased the injury resulting from the attacks of the grubs of *Lepidiota frenchi*, which, it will be recalled, is a species that has a two-year life cycle. Fortunately, this species has a rather limited distribution in the canegrowing areas, for it favours the wild grass lands.

“In spite of the hardness of the ground, a few beetles have succeeded in escaping from their pupation chambers, and are to be found on the feeding trees, though in many cases the newly-emerged beetles succumbed soon after reaching the surface, and before they are able to fly away. This is evidenced by their dead bodies, which are seen lying about in the fields.

“I have not been able to get away from the Station for any extended periods recently, hence my visits to other districts have been greatly curtailed. Shortly, however, I hope that this important feature of my work may be resumed, now that Mr. A. P. Dodd has returned from war service overseas. In this connection, I have been particularly anxious to continue the breeding and distribution of the beetle borer parasites (*Ceromasia sphenophori*), which are doing such excellent work in the Mossman district. The beetle borer (*Rhabdoenemis obscurus*) is spreading rapidly in the more humid districts of North Queensland, and demands immediate attention. It is a pest second in importance only to the cane grubs.

“EMERGENCE OF BEETLES.

“Though there has been a straggling flight of beetles, in spite of the drought, as indicated above, we are watching with interest for the effect upon the general emergence, now that the rains have set in. It is noteworthy that most of the beetles that have appeared on the feeding trees are considerably rubbed, indicating that they had great difficulty in escaping.

“MERINGA PLOTS.

“The soil in this area is exceedingly dry and hard, and as a result of the drought and injury by stock, which repeatedly got into the field, many of the stools are dying out, so that we can expect a poor ratoon crop. With a normal year, however, this would have come away splendidly, treated by bursting up the centres with the plough. In this case I threw the soil to the cane to prevent exposure of the roots during the excessive dryness; and plan to plough away after the rains, before scarifying. In the case of those plots which are to be treated with poison, I shall apply it in the drill on each side of the stools, where the grubs will find it most readily, if they come to feed upon the roots.

“GREENHILLS EXPERIMENTS.

“Though I had to forego an extensive line of experiments on late-planted cane, because of the unfavourable weather conditions, I am replacing these with experiments on ratoons in the infested area. A ton of arsenic, which I received recently from the South, is being used in this way.

“In one field of 5 acres I saved all the trash, which the cutters placed mostly in alternate rows. The free-middles were cleared up with pitch-forks before bursting them open with the plough. Arsenic was then dusted on the alternate trash rows. By this method I hope to conserve the humus of the trash; then the beetles, if they emerge abundantly, will crawl under these piles to oviposit. In this way the grubs will be centralised where they will readily find the arsenic while they are developing, and before they do serious damage to the cane roots.

“In these experiments I used 20, 40, and 60 lb. of the poison to determine how much is necessary to prevent the ravages of the grubs and to see if there are any detrimental effects to the cane from its use. Two of the acre plots were kept as checks—no poison being applied, though they are to receive the same treatment otherwise.”

RAINS BENEFICIAL TO THE CANE CROPS.

On his return to Brisbane from the Bundaberg and Gin Gin sugar districts, the General Superintendent of the Bureau of Sugar Experiment Stations stated that the recent bountiful rains had effected a highly beneficial change in the appearance of the cane crops. The young cane was now a beautiful green colour and was growing vigorously. The early planted cane was doing remarkably well in many portions of the Bundaberg area, and if conditions remain favourable, and the winter is not too severe, there should be a fair crushing season in this district, though it will probably be a late one. At the Experiment Station the various experiments were looking exceptionally well. Some interesting field trials are being made with different quantities of pulverised limestone, from 1 to 6 tons per acre being used. Experiments with using plants cut from plant cane and 1st, 2nd, and 3rd ratoon cane are also being made, as well as using sets for plants from different portions of sticks of cane.

The new cane varieties from Java, Mauritius, India, and Hawaii are looking well and arousing considerable interest, particularly the Indian cane known as Shahjahanpur No. 10, which has successfully resisted frost during the past two seasons. The cane known as Q.813, which has been distributed from the station, is coming into great favour, and the Fairymead Sugar Company are stated to have planted 100 acres of this variety. A large number of applications for this cane and the Shahjahanpur are still being registered.

At Gin Gin the cane, though of fine appearance, is more backward than at Bundaberg, and the rainfall to date has not been so great. The spring planting, however, was much larger than usual, and many fresh areas have been planted up in order to keep the mill going. The cultivation has been very good, and the young cane is beautiful, the district generally looking a picture. The river flats are green with fine crops of cane, lucerne, and corn, all doing splendidly. This area comprises some particularly rich soils.

CULTIVATION OF PAPAW FOR PAPAIN.

A correspondent lately wrote asking us to publish instructions for extracting papain from the papaw fruit. We cannot do better than supply the information as given in the "Year Book of the Ceylon Agricultural Society" for 1919-1920, by J. S. de Silva, C.A.S., who prefaces his paper on the subject by directions for sowing the seed, transplanting, &c. The seed, to ensure germination, is covered in the seed bed with rubbish which is set on fire. Another method is to cut down the scrub growth, throw the seed among the heap, and set fire to it; then clean away the resulting rubbish, leaving as much of the ash as possible. The seeds, thus treated, soon sprout out, and the ash serves as manure. Fresh seeds take from ten to fifteen days to germinate, while old and much-dried seeds take from one to two months. For the purpose of obtaining papain, the fruits are tappable when three months or more old.

In extracting the latex the fruits should not be scarified with steel knives, but bone, glass, or ivory, or a sharp-edged piece of bamboo should be used for the purpose, and the juice collected in china or earthenware containers and promptly dried. It coagulates naturally, forming a resinous-looking, granular mass, and is then dried in the sun. It must be dried rapidly, otherwise it putrefies and gives off an unpleasant sour odour. To obviate this, a trace of formalin should be added to the juice when collected. Early morning is the best time to tap, the flow then being more abundant.

The dark colour assumed by the latex in sun-drying is due to exposure to air and light, and also to smoke-drying during wet weather, but this does not affect the purity of the stuff, although it is objected to by dealers. Pure, light-coloured papain can be obtained by rapid drying in a hot-air chamber, while the putrefaction of under-dried latex can be prevented by treatment with formalin. The time required for drying depends on climatic conditions. On an average, under ordinary circumstances, it takes from three to four days. This can be reduced by artificial drying to one to two days. The use of an unused, fresh earthenware vessel is found best, owing to its power of absorbing moisture and consequent rapid drying. When the granular papain is crisp, like biscuit, and crushes easily between the fingers, it is fit to be bottled up for export.

The fine varieties of papaw trees do not bear so heavily as the native papaya tree. The former yield from fifteen to twenty fruits and five of them hardly yield 1 lb. of dried papain, whereas the common sort, carrying thirty to forty fruits, have been known to yield 1 lb. per tree. Packing papain for export must be in wooden cases lined with tea lead, with a second inner lining of oil paper. After folding the paper over the top, the lead seams should be soldered before nailing down the cover

General Notes.

THE PRICE OF SILVER.

Silver is now quoted in London at 7s. 7½d.

We have no information as to the output of the silver workings at Indooroopilly, but doubtless holders of mining rights in that district will be encouraged to energetically develop the existing lodes and to prospect for others.

NEW TEXTILE FABRIC.

It is stated that the Premier of New South Wales (Mr. Holman) has received a copy of the "United States Commerce Reports," dated 27th October, in which reference is made to a new textile fabric which, it is claimed, will tend to lower the present high cost of men's clothing. A new fabric is being placed on the market, says the United States Trade Commissioner in London, by Mr. Pudsey, the Yorkshire manufacturer. London agents for the manufacturer state that the new cloth is made entirely from silk voile or short fibres. Whilst it is superior in wearing properties to pure worsted, it can be sold at the price of shoddy cloth, or one-fourth the price of best wool fabrics. It is said to be strong and almost untearable, and very suitable to hard wear, and can be obtained in greys, browns, and blacks. The new fabric is claimed to be a British discovery, and at present manufactured by only one firm.

KILLING RATS IN THE PACIFIC ISLANDS.

Rats cause a large amount of damage among the cocoanut trees in the Pacific Islands, and many different ways have been tried to cope with them. They make their nests in the top of the trees, and attack the young nuts, sucking out the juice. On one island they imported many years ago a large number of terriers; these multiplied rapidly, and had no effect on the rats; they fought among themselves and lived on crabs and shell fish. Then 400 cats were imported; these neglected the rats and took to fishing, catching with their paws the young fish. Now the cats and dogs have nearly all been destroyed. Lastly, minahs were imported from North Queensland and Borneo. These birds have been most successful. Not only do they kill and eat the young rats, but even attack the old ones and kill them. A friend from the Pacific informs us that the rat difficulty is solved when minahs are brought in numbers to an island.—"Pastoral Review."

A BIRD SCARE.

The increase of sparrows, especially in the suburban districts around Brisbane, and other cities and towns of Queensland, has caused several amateur and professional gardeners to set their wits to work to evolve some efficient means of driving them from their destructive work. The accompanying sketch shows a very simple but effective scare, devised by Sergeant Auld, Kangaroo Point. The accompanying photograph of the apparatus shows it suspended over a garden bed where it revolves windmill-like with the slightest breeze from any quarter. We might suggest that a few feathers attached to the "sails" would add to the searing effect on the predators.



A BUSH SAFE FOR SELECTORS.

We have received from Mr. L. Ghizzo, a selector at St. Helens, Mackay, the following description of a safe to protect the contents from ants and other pests. The idea seems to be a very good one, and as will be seen by the accompanying illustration, of very simple construction.

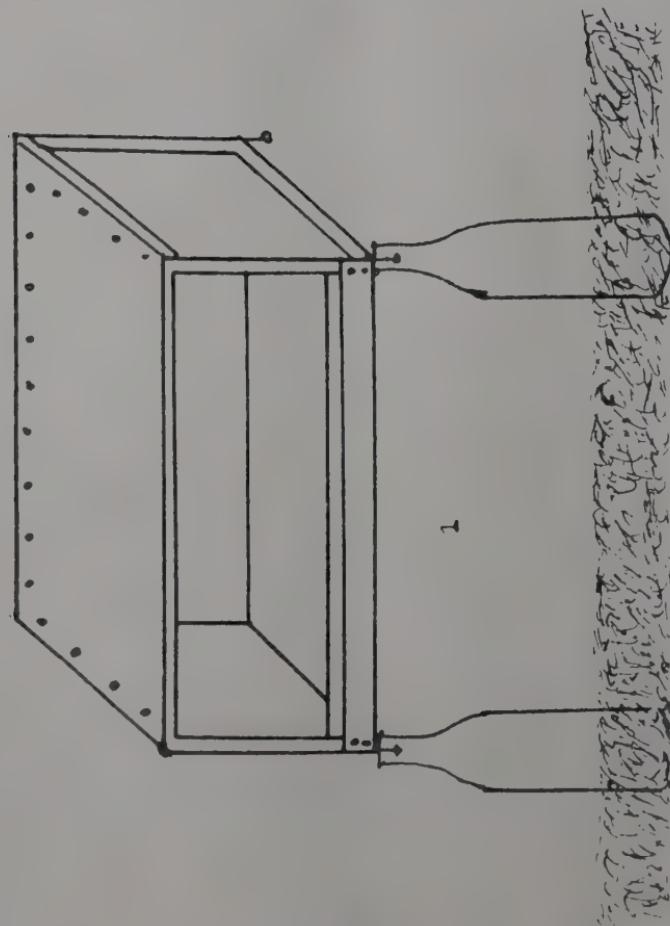
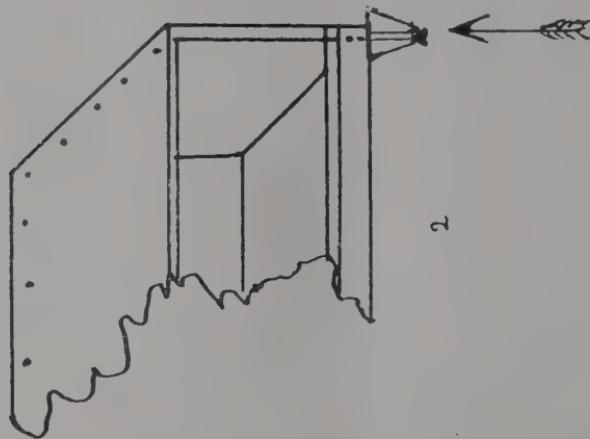


Diagram No. 1 is applicable to a bush home with an earthen floor, and is made as follows:—Take any kind of a box and procure four bottles, one for each corner of the box, and sink them perpendicularly into the ground to a depth of 3 or 4 inches. Then drive a long nail half way into each corner of the box, leaving half of the nail projecting, which will fit into the neck of the bottle as shown in the diagram.

Diagram No. 2 shows a safe for city use and boarded floors. This is almost similar to No. 1, with the exception that the box is turned over and a cork is driven in with a nail into each corner. The box is then turned over and the corners with the corks attached are then placed in the bottles. All that is needed afterwards is to rub the bottles daily.

DUTCH NEW GUINEA.

A fortnightly commercial review, entitled "The Dutch East Indian Archipelago," in its issue of 20th November, 1919, amongst much valuable information on the trade and possibilities of trade between Australia and Java, Sumatra, Borneo, Celebes, &c., gives a very interesting account of the acquisition of that portion of Papua not within the British jurisdiction, and of the progress made there in late years. This little historical sketch, although not treating of agriculture and stock, gives a very fair idea of North-Western New Guinea and its resources, and should prove of interest to Australians, especially those interested in tropical products such as copra, tobacco, rubber, sugar, rice, &c., &c. The article reads as follows:—

THE NEW RESIDENCY OF NEW GUINEA.

Although the western half of New Guinea, previously a domain of the Sultan of Tidore, has been many times visited by our ships during the past century, yet, until the year 1823, it had never been officially proclaimed a possession, neither had any settlement been attempted there.

However, Mr. Merkus, at that time Governor of the Molucca Islands, saw that it was imperative to annex the Western portion of New Guinea, as being the Eastern key to the Moluccas, and in order to protect the islands on that side from foreign invasion. Consequently, on the 24th August, 1928, the Western part of New Guinea, up to 141 degrees E. L., was formally proclaimed a "possession," and the fort "du Bus" built in Triton Bay on the south-west coast, while the name of Merkus-oord was given to the surrounding country.

The choice of place, however, soon proved to be an unlucky one, on account of the unhealthy climate, which produced such a high rate of mortality that, after ten years, it became necessary to abandon the settlement. The fort was then pulled down and the whole of the coast deserted.

Later on, this official proclamation regarding Western New Guinea proved to have been by no means premature, as England afterwards took possession of the Southern and Eastern part, and in 1885 Germany occupied the North-East portion, now a protectorate under the Australian Commonwealth. The boundaries of Dutch and English New Guinea are regulated by treaty.

The administrative division of Dutch New Guinea, up till now, has been as follows:—

I.—Belonging to the residency of Amboina—

- (a) Western New Guinea (Fak Fak) assistant residency—from Tandjong Selee to Cape Steeboom (Polen Mauro), and surrounding islands.
- (b) Southern New Guinea (Merauke) assistant residency—from Cape Steeboom to the mouth of the Benschbach River, and surrounding islands. This was formerly a separate district, like Billiton; but by Royal decree in May, 1913, it was joined to Amboina.

II.—Belonging to the residency of Ternate—

- (c) Eastern New Guinea—the land extending from the estuary of the Benschbach River, on the south coast, up to the point where the Fly River crosses the 141 degree meridian.
- (d) Northern New Guinea (Manokwari) assistant residency—the country to the north of where the Fly River crosses the 141 degree meridian. Here, too, are the settlements of Hollandia and Sorong. A portion also of the Radja Ampat Island group (consisting of Waigecoe, Salawati, and Batanta), belongs to Northern New Guinea.

In the year 1891 the Government began to show a little more interest in New Guinea by including this possession in the steamer routes of the "Paketvaart" Company that had just then come into existence; and it was arranged that a steamer should call once every three months at Dore, Roon, Ansoes, Djamma, and Humboldt's Bay on the north coast, and at Sekar, Sekaroe, and Dobo, on the west and south coasts.

According to Melville, the portion originally taken possession of covered 3,210 square miles, with a population, roughly estimated, of 200,000 Papuas. As our present possession, however, extends over one-half of the island only, we may take it to cover 6,000 square miles.

Geelvinck Bay in the North, which is nearly 50 miles wide at the entrance, runs inland for about the same distance, cutting off a large peninsula, called Vogeltop, which is joined to the mainland by an isthmus 6 miles wide. The Gulg of MacCleur (formerly Vinck's Gulf, and named after Nicholas Vinck, the first discoverer in 1662), extends inland for 25 miles, dividing the peninsula of Vogeltop into two smaller ones.

The largest known river is the Amberano or Rochussen, which probably has its source in the Van Rees Mountains, and flows out into the large Geelvinck Bay. It can be navigated by deep-water vessels for a distance of 60 miles. The Jikali River takes its source from the high mountains west of Geelvinck Bay, and flows into the Gulf of MacCleur. The Fly River flows into Torres Strait east of the 140 degree meridian.

The climate of New Guinea is scarcely to be commended. On the north coast the temperature sometimes rises to 90 degrees Fahrenheit during the east monsoon, but alternate sea and land breezes give some relief.

The best known products are chiefly sago, ebony, ironwood, and copra. This last product of the millions of cocoanut-palms, as well as the extensive bird of paradise trade, was the cause of Merauke being brought under the "Customs."

As to how far the country is still exposed to danger from the natives may be gathered from a cable from Ambon on the 24th July last, stating that, on account of head-hunting expeditions being so rife, two military brigades, in command of a lieutenant-colonel, had been despatched thither.

On the 18th July last, news was cabled to the "Eoerabaiasch-Handelsblad" that Banda is to have a wireless station; and, as New Guinea has now been raised to the dignity of a separate residency, it is expected that Merauke, Fak Fak, and Manokwari, the seats of the Assistant Residents of South, West, and North New Guinea, and probably also the settlements of Hollandia and Sorong, the seats of the civil authorities, will share in that privilege.

Answers to Correspondents.

INCUBATOR PRIZE CHICKENS.

In reply to a correspondent who bought some clutches of incubated prize Orpington chickens, and found some of them to be deformed, with tails twisted sideways, and deformed backbones, Mr. J. Beard, Instructor in Poultry, Department of Agriculture, says:—"The cause of the deformity is by allowing the heat in the incubator to get too high during the last stages of incubation. The temperature should not be allowed to go higher than 103 degrees, and when cooling the eggs after the eighteenth day, probably not sufficient time was allowed for the process, which should be from 30 to 45 minutes, according to climatic conditions."

DISEASE IN TURKEY CHICKS.

In reply to Mr. P. Dooman, junr., Grandchester, Mr. J. Beard, Poultry Instructor, advises as follows:—"Wash the eyes, nostrils, and mouth thoroughly with a solution of boracic acid in warm water at the rate of 15 grains to the ounce. Clean the nostrils out by pressure with the finger and thumb, and the cleft in the mouth with a strong feather. This cleansing process should be repeated at least once a day, and in severe cases, where the discharge is very profuse, even oftener. Add a little kerosene to their drinking water. All affected birds should be quarantined."

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR FEBRUARY, 1920.

Article.	FEBRUARY.	
	Prices.	
Arrowroot	ton	£60
Bacon	lb.	1s. 4d.
Barley	bush.	7s.
Bran	ton	£13
Broom Millet	"	£10 to £60
Broom Millet (Sydney)	"	£60 to £70
Butter (First Grade)	cwt.	176s.
Chaff, Lucerne	ton	£9 10s. to £14 10s.
Chaff, Mixed	"	£9 to £11 10s.
Chaff, Oaten	"	£10 to £13
Chaff, Wheaten	"	£5 to £11 15s.
Cheese	lb.	11d.
Flour	ton	£13 to £17 5s.
Hams	lb.	2s. 4d.
Hay, Lucerne	truss	£7 10s. to £8 10s.
Hay, Oaten	"	£15
Honey	lb.	6d. to 7½d.
Maize	bush.	8s. to 10s. 2d.
Oats	"	7s. 3d.
Onions	ton	£10 to £27 15s.
Peanuts	lb.	7d. to 10d.
Pollard	ton	£14
Potatoes	s. bag	£20 to £27 10s.
Potatoes (Sweet)	"	8s. to 12s.
Pumpkins (Cattle)	ton	£18 to £25 5s.
Eggs	doz.	1s. 6d. to 2s. 4d.
Fowls	per pair	4s. 6d. to 10s. 9d.
Ducks, English	"	4s. 9d. to 6s.
Ducks, Muscovy	"	7s. to 10s.
Geese	"	10s. 5d. to 11s.
Turkeys (Hens)	"	17s. to 19s.
Turkeys (Gobblers)	"	36s. to 48s.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen bundles	...	...	...	...	5s. to 6s. 9d.
Beans, per sugar-bag	...	...	...	...	3s. to 12s.
Beetroot, per dozen bunches	...	...	...	...	9d. to 1s. 3d.
Cabbages, per dozen	...	...	...	...	3s. to 18s.
Carrots, per dozen bunches	...	...	...	...	1s. 6d. to 1s. 8d.
Cucumbers, per dozen	...	...	...	...	3d. to 2s. 6d.
Lettuce, per dozen	...	...	...	...	9d. to 1s. 9d.
Marrows, per dozen	...	...	...	...	6s. to 12s. 6d.
Parsnips, per dozen bundles	...	...	...	...	1s. 6d. to 2s. 6d.
Peas, per sugar-bag	...	...	...	...	10s. to 15s. 6d.
Potatoes (Sweet), per sugar-bag	...	...	...	...	8s. to 10s.
Pumpkins (table), per dozen	...	...	...	...	8s. to 10s. 6d.
Tomatoes, per quarter-case	...	...	...	...	2s. 6d. to 13s.
Turnips, per doz. bunches	...	...	...	...	3s. to 4s.
Turnips (Swede), per sugar bag	...	...	...	...	1s. 6d. to 2s. 3d.

SOUTHERN FRUIT MARKETS.

Article.	FEBRUARY.				Prices.
Bananas (Queensland), per double-case...	7s. to 25s.
Bananas (Tweed River), per double-case	12s. to 25s.
Lemons, per bushel-case	20s.
Oranges, per bushel-case	20s. to 32s.
Oranges (Navel), per bushel-case	5s. to 9s.
Passion Fruit, per bushel-case	10s. to 18s.
Pineapples (Queens), per double-case	12s. to 16s.
Pineapples (Ripleys), per double-case	5s. to 10s.
Pineapples (Common), per double-case	5s. to 8s.
Tomatoes, per quarter case

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per bushel-case ...	...	...	...	...	6s. to 12s.
Apples, Cooking, per bushel-case	...	...	...	...	4s. to 12s.
Apricots, per quarter-case (Prime)	...	...	...	...	10s. to 12s. 6d.
Apricots, per quarter-case (Small)	...	...	...	...	4s. to 7s. 6d.
Bananas (Cavendish), per dozen ...	...	...	...	...	1s. to 4s.
Bananas (Sugar), per dozen	...	...	...	...	4d. to 6d.
Citrons, per cwt.	...	...	...	...	...
Cocoanuts, per sack	...	...	...	...	15s. to 25s.
Grapes, per lb.	...	...	...	...	2½d. to 5d.
Lemons (Lisbon), per half bushel-case	...	...	...	...	15s. to 30s.
Lemons (Rough), per cwt.	...	...	...	...	...
Limes, per half bushel-case	...	...	...	...	...
Mangoes, per case	...	...	...	...	1s. to 4s.
Nectarines, per quarter-case	...	...	...	...	3s. to 6s.
Oranges, per bushel-case ...	...	...	...	...	30s. to 35s.
Oranges (inferior), per quarter-case	...	...	...	...	2s. to 4s. 6d.
Papaw Apples, per quarter-case ...	...	...	...	...	1s. 6d. to 5s.
Passion Fruit, per half bushel-case	...	...	...	...	3s. to 8s.
Peaches, per quarter-case	...	...	...	...	2s. to 6s.
Pineapples (Rough), per dozen ...	...	...	...	...	3s. to 7s. 6d.
Pineapples (Smooth), per dozen ...	...	...	...	...	5s. to 7s. 6d.
Pineapples (Ripley), per case	...	...	...	...	5s. to 7s. 6d.
Plums, per quarter-case ...	...	...	...	...	6s. to 10s.
Rock melons, per dozen ...	...	...	...	...	...
Tomatoes (prime), per quarter-case	...	...	...	...	3s. 6d. to 10s.
Tomatoes (inferior), per quarter-case	...	...	...	...	5s. 6d. to 13s.
Water melons, per dozen ...	...	...	...	...	6s. to 18s.

TOP PRICES, ENOGGERA YARDS, JANUARY, 1920.

Animal.	JANUARY.				Prices.
Bullocks	£25 10s. to £38 10s.
Cows	£22 to £24
Merino Wethers	79s.
Crossbred Wethers	72s.
Merino Ewes	72s.
Crossbred Ewes	63s. 6d.
Lambs	45s.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JANUARY, 1920, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JANUARY, 1920 AND 1919, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL		TOTAL RAINFALL		Divisions and Stations.	AVERAGE RAINFALL		TOTAL RAINFALL	
	Jan.	No. of Years' Records.	Jan., 1920.	Jan., 1919.		Jan.	No. of Years' Records.	Jan., 1920	Jan., 1919.
<i>North Coast.</i>									
Atherton	12.87	18	12.90	4.10			
Cairns	17.16	37	18.64	8.62			
Cardwell	17.31	47	25.67	8.58			
Cooktown	15.00	43	9.41	9.10			
Herberton	9.93	32	11.84	6.27			
Ingham	17.17	27	13.99	9.20			
Innisfail	21.40	38	13.73	12.54			
Mossman	19.85	11	16.22	10.09			
Townsville	12.02	48	11.71	6.09			
<i>South Coast—continued:</i>									
Nambour	9.27	23	22.32	1.12			
Nanango	4.64	37	6.70	0.18			
Rockhampton	9.46	32	11.58	0.34			
Woodford	7.40	32	15.50	0.20			
<i>Darling Downs.</i>									
Dalby	3.33	49	6.49	0.71			
Emu Vale	3.32	23	3.23	0.89			
Jimbour	3.86	31	5.01	0.67			
Miles	3.99	34	4.52	1.03			
Stanthorpe	3.70	46	2.53	0.18			
Toowoomba	5.06	47	6.74	0.48			
Warwick	3.69	32	4.44	0.23			
<i>Maranoa.</i>									
Roma	3.52	45	1.66	1.74			
<i>State Farms, &c.</i>									
Bungeworgorai	2.62	5	2.68	0.49			
Gatton College	4.48	20	5.47	1.13			
Gindie	4.23	20	4.33	Nil			
Hermitage	2.99	13	5.54	0.15			
Kairi	9.49	5	9.46	4.76			
Sugar Experiment							
Station, Mackay	17.24	22	21.87	10.29					
Warren	8.53	5	7.26	0.44			

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for January this year, and for the same period of 1919, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, State Meteorologist.

LAW SOMNER'S for FODDER CROPS.

A New Oat, "Mortgage Lifter."

THIS variety was originally imported from America, and grown in South Australia, where results proved so satisfactory that the original grower preserved the seed from his first crop, and has grown it with every success during the past few seasons.

This New Oat grows to a height of 6feet, and has yielded from 90 to 100 bushels to the acre. One grower reports very satisfactory results, obtaining 61 bushels in spite of a very dry season.

Graded, re-machined, clipped and tailed, **10/6** bushel; **9/6** bushel, in sack lots; **9/-** bushel in 5-sack lots.

Rape, THE Food for Sheep.

R APE is one of the most valuable Fodder Crops in cultivation. It is easily cultivated, makes strong, rapid growth, and produces an abundance of highly nutritious and palatable green feed, greatly relished by all kinds of farm stock.

GIANT KANGAROO RAPE (to arrive) will fatten three more sheep to the acre than any other variety. Exceedingly quick growth. **1/6** lb.; **150/-** cwt.

DWARF ESSEX RAPE. Best English Imported. **1/3** lb.; **112/-** cwt. New Zealand grown, **1/2** lb.; **102/8** cwt.

Sow WHITE MUSTARD with Rape; it prevents blowing; **2/-** lb.; **196/-** cwt., in $\frac{1}{4}$ -cwt. lots.

SPECIAL FODDER CIRCULARS
are issued each season. They are
invaluable to Farmers. A copy will be
sent post free on request.

Lucerne, The King of Fodder Crops.

LUCERNE will fatten Cattle, Sheep, Pigs, etc., better than any other feed and with less expense. All our lucernes are specially machine-cleaned, hand-sleaved, free from Dodder, and true to name, and have passed the Government test.

HUNTER RIVER LUCERNE.
Great scarcity of this splendid variety. Book your order now, as demand exceeds supply. **3/-** lb.; **320/-** cwt.

Sheep's Burnet

A MOST valuable Fodder Plant, thriving on the poorest chalk soils. A great drought-resistant; very suitable for dry countries where lucerne will not succeed. **1/6** lb.; **140/-** cwt., f.o.b., Melbourne.

Swedes and Turnips

Are excellent feed for Cattle, Horses, Sheep, and Pigs. Ready in the late Autumn, and, if pulled and stored, can be kept for a long time during the winter months when other feed is scarce. **5/-** lb.; **4/6** lb. in 7-lb. lots or more.

LAW SOMNER Pty. Ltd.

— WHOLESALE AND RETAIL —
SEED AND PLANT MERCHANTS,

HEADQUARTERS :

139-141 SWANSTON STREET, MELBOURNE, VICTORIA.

Farm and Garden Notes for April.

FIELD.—The wheat land should now be ready for sowing the early wheats, and that which has not been prepared should be ploughed without delay, April, May, and June at latest being the months for sowing. The main potato crop, planted in February and March, will be ready for a first or second hilling up. The last of the maize will have been got in. Where cotton is grown, the pods will now be opening, and advantage should be taken of dry weather to get on with the picking as quickly as possible. Picking should not be begun until the night dew has evaporated nor during rain. Sorghum seed will be ripe. Tobacco also will be ripening, and either the leaves or the whole plant harvested. Lucerne may be sown, as the growth of weeds has now slackened off, but the ground must be thoroughly prepared and cleaned. Sow oats, barley, rye, wheat, mangols, and Swede turnips. Plant out paspalum roots. Seed wheat of whatever variety soever should be dipped in a solution of sulphate of copper (bluestone) in the proportion of 1 lb. of sulphate to 24 gallons of water. The seed may also be treated with hot water by plunging it in a bag into hot water at 120 degrees Fahr. for a minute or two, and then into water heated to 135 degrees Fahr. Allow it to remain in this for ten minutes, moving it about all the time. Then plunge the seed into cold water and spread out to dry. This plan is useful in districts where bluestone may not be obtainable. Another safeguard against bunt, smut, black and red rust is to treat the seed with formalin at the rate of 1 lb. of formalin to 40 gallons of water. Schering's formalin costs about 2s. 10d. per lb., and is sold in bottles. It is colourless and poisonous, and should be kept where no children or persons ignorant of its nature can have a chance of obtaining it. To treat the seed, spread it on a wooden floor and sprinkle the solution over it, turning the grain over and over until the whole is thoroughly wetted. Then spread it out to dry, when it will be ready for sowing. Instead of sprinkling, dipping may be resorted to. A bushel or so of seed is placed in a bag and dipped in the solution. During five minutes the bag is plunged in and out, and then the seed is turned out to dry. Formalin is less injurious to the grain than bluestone, but, while the latter can be used over and over again, formalin becomes exhausted. It therefore follows that only the amount required for immediate use for sprinkling should be prepared. Do not sow wheat too thickly. Half a bushel to the acre is sufficient—more on poor land and less on rich soils. On light, sandy soil the wheat should be rolled. On sticky land it should only be rolled when the land is dry, otherwise it will cake, and must be harrowed again after rolling. When the wheat is 6 in. high go over it with light harrows. If the autumn and winter should prove mild and the wheat should lodge, it should be kept in check by feeding it off with sheep.

KITCHEN GARDEN.—Hoe continually among the crops to keep them clean, and have beds well dug and manured, as recommended last month, for transplanting the various vegetables now coming on. Thin out all crops which are overcrowded. Divide and plant out pot-herbs, giving a little water if required till established. Sow broad beans, peas, onions, radish, mustard and cress, and all vegetable seeds generally except cucumbers, marrows, and pumpkins. Early celery should be earthed up in dry weather, taking care that no soil gets between the leaves. Transplant cauliflowers and cabbages, and keep on hand a supply of tobacco waste, preferably in the form of powder. A ring of this round the plants will effectually keep off slugs.

FLOWER GARDEN.—The operations this month will depend greatly on the weather. If wet, both planting and transplanting may be done at the same time. Camellias, gardenias, &c., may be removed with safety. Plant out all soft-wooded plants such as verbenas, petunias, pentstemons, &c. Sow annuals, as carnations, pansy, mignonette, daisy, snapdragon, dianthus, stocks, candytuft, phlox, sweet peas, &c. Those already up must be pricked out into other beds or into their permanent positions. Growth just now will not be too luxuriant, and shrubs and creepers may be shortened back. Always dig the flower beds rough at first, then apply manure, dig it in, and after this get the soil into fine tilth. Land on which you wish to raise really fine flowers should have a dressing of bonedust lightly turned in. Wood ashes also form an excellent dressing for the garden soil. Prune out roses. These may be planted out now with perfect success. Take up dahlia roots, and plant bulbs as recommended for March. Layers that have made sufficient roots should now be gradually severed from the plant, and left for a fortnight before potting, to ripen the young roots.

Orchard Notes for April.

THE SOUTHERN COAST DISTRICTS.

The gathering and marketing of citrus fruits, as well as of pines, bananas, custard apples, persimmons, &c., is the principal work of the month. In the Notes for March attention was drawn to the necessity for keeping all pests in check, particularly those attacking the ripening fruit. As it is the height of folly to look after the orchard thoroughly during the growing period of the crop and then to neglect the crop when grown, every possible care must be taken to keep fruit fly, peach moth, black brand, or other pests that destroy or disfigure the fruit in check, and this can only be accomplished by combined and systematic action. Citrus fruit at this time of the year often carries badly, as the stem is tender, easily bruised, full of moisture, and, consequently, very liable to the attacks of the blue mould fungus, which causes specking. The loss from this cause can be lessened to a considerable extent by carefully attending to the following particulars:—

- 1st. Never allow mouldy fruit to hang on the trees or to lie about on the ground. It should be gathered and destroyed, so that the countless spores which are produced by the fungus shall not be distributed broadcast throughout the orchard, infesting many fruit, and only waiting for a favourable opportunity, such as an injury to the skin by an insect or otherwise, combined with favourable weather conditions (heat and moisture), to start into growth.
- 2nd. Handle the fruit carefully to prevent bruising. Cut the fruit, don't pull it, as pulling is apt to plug the fruit—that is to say, to either pull the stem out or injure the skin round the stem—and a fruit so injured will go mouldy.
- 3rd. Sweat or dry the fruit thoroughly; if the weather is humid, laying the fruit out in the sun on boards or slabs is a very good plan.
- 4th After sweating, examine the fruit carefully, and cull out all bruised or punctured fruit, and only pack perfectly sound dry fruit. It is better for the loss to take place in the orchard than for the loss to take place in the case in transit.
- 5th. If the mould is very bad, try dipping the fruit for a few seconds in a 2 per cent. solution of formalin. This will kill the spores, and if the fruit is placed in the sun and dried quickly before packing there will not be much chance of its becoming reinfested.

Don't gather the fruit too green, especially such varieties as the Beauty of Glen Retreat mandarins, as immature fruit spoils the sale of the good article.

If the orchard has not been cleaned up after the summer rains, do so now; and do any other odd jobs that may be required, such as mending fences, grubbing out dead or worthless trees, cleaning out drains, &c.

Strawberry planting may be continued, and where new orchards are to be planted continue to work the soil so as to get it into the best possible tilth.

THE TROPICAL COAST DISTRICTS.

Clean up the orchards after the rainy season. Look out for scale insects, and cyanide or spray for same when necessary.

Go over the trees carefully, and when there is dead wood or water sprouts remove them. If bark fungus is showing, paint the affected branches with sulphur and lime wash. Clean up bananas, pineapples, and other fruits, as after the end of the month it is probable that there will not be any great rainfall, so that it is advisable to keep the ground well cultivated and free from weeds, so as to retain in the soil the moisture required for the trees' use during the winter months. Keep bananas netted; destroy guavas wherever found.

THE SOUTHERN AND CENTRAL TABLELANDS.

If the orchards and vineyards have not already been cleaned up, do so. Cultivate or plough the orchard, so as to get the surface soil into good tilth, so that it can absorb and retain any rain that falls, as, even though the trees will simply be hardening off their summer's growth of wood, it is not advisable to let the ground dry out. When citrus fruits are grown, attend to them in the manner recommended for the Southern Coast Districts; and, when grown in the dry parts, keep the land in a state of good cultivation. Should the trees require it, a light watering may be given. Do not irrigate vines; let them ripen off their wood.

SHORTHAND

26:6:26 System

Leading West Australian Newspaper
investigates claims as to Ease, Speed,
and Efficiency of this System.

(Reprint from *Western Mail* 30/10/19)

EARLY in September, a correspondent asked about the Bradshaw system of shorthand. As I do not know shorthand I made inquiries from the principals of two commercial schools, and neither recommended it.

Mr. G. S. Thompson, P.C.T., of Lombard Chambers, 61 St. George's Terrace, Perth, who is in charge of the Bradshaw System School of Shorthand in Perth, has called and pointed out that the opinions which were published in regard to the Bradshaw system were by men who teach the old system, and therefore they should not be taken against the many people who have learned the new and more simple system, and find it is thoroughly efficient. Mr. Thompson produced a number of letters, and gave references to many ex-students, some of whom had learned the Pitman system before and deliberately threw it aside in favor of the Bradshaw system.

He mentioned one journalist (a member of the "West Australian," who has since confirmed his statement), who learned the Pitman system and

attained a speed of 140 words a minute. He then deliberately threw it over and took up the Bradshaw system. In six weeks he was using it in his daily work, and he now writes a legible shorthand note at the rate of 180 words per minute. Mr. Thompson says he himself taught Pitman shorthand for 30 years and used it as a journalist and as a certificated teacher, and is therefore qualified to express an opinion upon the relative merits of the two systems, one of which is 100 years old, while the other is modern, and the outlines of which contain the vowels, thus making for legibility.

He claims that it is not only immensely more simple, and can be learned much more quickly, but that it is more efficient than the old system. As I gave the opinions of the two rival teachers in all good faith, it is only fair that I should give equal prominence to Mr. Thompson's claims for the Bradshaw system, and to advise those who want shorthand quickly to thoroughly investigate its merits.

BRADSHAW'S 26:6:26 SHORTHAND is taught by post in 5 Easy Lessons.

Send 3d. for postage. Ask for Pamphlet No. P3 and specimen lesson, sent free without obligation on your part.

BRADSHAW'S BUSINESS
COLLEGE
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246-50 Flinders St., MELBOURNE, VIC.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.

AT BRISBANE.

1920.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		
	Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4.57	6.45	5.21	6.42	5.42	6.19	5.59	5.46	
2	4.58	6.46	5.22	6.42	5.42	6.18	5.59	5.44	
3	4.59	6.46	5.23	6.41	5.43	6.17	6.0	5.43	
4	5.0	6.46	5.24	6.41	5.44	6.16	6.0	5.42	
5	5.0	6.46	5.24	6.40	5.44	6.15	6.1	5.41	
6	5.1	6.47	5.25	6.39	5.45	6.14	6.1	5.40	
7	5.2	6.47	5.26	6.39	5.45	6.13	6.2	5.39	
8	5.2	6.47	5.27	6.38	5.46	6.12	6.2	5.38	
9	5.3	6.47	5.28	6.37	5.46	6.11	6.3	5.37	
10	5.3	6.47	5.28	6.36	5.47	6.10	6.3	5.36	
11	5.4	6.47	5.29	6.36	5.48	6.9	6.4	5.35	
12	5.5	6.47	5.30	6.35	5.48	6.8	6.4	5.35	
13	5.6	6.47	5.31	6.35	5.49	6.7	6.4	5.34	
14	5.6	6.47	5.31	6.34	5.49	6.6	6.5	5.33	
15	5.7	6.47	5.32	6.33	5.50	6.5	6.5	5.32	
16	5.8	6.47	5.33	6.32	5.50	6.4	6.6	5.31	
17	5.9	6.47	5.33	6.31	5.51	6.3	6.6	5.30	
18	5.10	6.47	5.34	6.30	5.51	6.2	6.7	5.29	
19	5.10	6.47	5.35	6.29	5.52	6.1	6.7	5.28	
20	5.11	6.47	5.35	6.28	5.52	6.0	6.8	5.27	
21	5.12	6.46	5.36	6.28	5.53	5.59	6.8	5.26	
22	5.13	6.46	5.36	6.27	5.53	5.58	6.9	5.25	
23	5.14	6.46	5.37	6.26	5.54	5.57	6.9	5.24	
24	5.15	6.45	5.38	6.25	5.54	5.56	6.10	5.23	
25	5.16	6.45	5.38	6.24	5.55	5.55	6.10	5.22	
26	5.16	6.45	5.39	6.23	5.56	5.53	6.11	5.21	
27	5.17	6.44	5.40	6.22	5.56	5.52	6.11	5.20	
28	5.18	6.44	5.41	6.21	5.57	5.50	6.12	5.19	
29	5.19	6.43	5.41	6.20	5.57	5.49	6.12	5.18	
30	5.20	6.43	...	...	5.58	5.48	6.13	5.18	
31	5.21	6.42	...	...	5.58	5.47	...	...

PHASES OF THE MOON.

The times stated are for Queensland, New South Wales, and Victoria, where the clock time is identical.

H. M.

6 Jan. ○ Full Moon 7 5 a.m.

13 " " Last Quarter 10 9 a.m.

21 " ● New Moon 3 27 p.m.

29 " ♀ First Quarter 1 38 a.m.

Perigee on 5th, Apogee on 17th. (An occultation of the planet Venus by the Moon will take place on the 17th. Unfortunately not visible in Australia.)

4 Feb. ○ Full Moon 6 42 p.m.

12 " " Last Quarter 6 49 a.m.

20 " ● New Moon 7 35 a.m.

27 " ♀ First Quarter 9 50 a.m.

Perigee on 2nd and 28th, Apogee on 13th

5 Mar. ○ Full Moon 7 13 a.m.

13 " " Last Quarter 3 57 a.m.

20 " ● New Moon 8 56 p.m.

27 " ♀ First Quarter 4 45 p.m.

Apogee on 12th, Perigee on 24th.

3 Apr. ○ Full Moon 8 55 p.m.

11 " " Last Quarter 11 24 p.m.

19 " ● New Moon 7 43 a.m.

25 " ♀ First Quarter 11 28 p.m.

Apogee on 9th, Perigee on 21st.

There will be no eclipse of the Sun or Moon till May 3rd.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise about 4 minutes later than at Brisbane if it were not for its higher elevation, and at Oontoa (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

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